Volume 74 no 4
April 2006

Amateur Radio

The magazine for AUSTRALIAN radio amateurs

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Hayden Honeywood VK7HAY *reviews* The Diamond X-200A antenna

- Build a super-compact portable 20 W auto-tuner for HF and 6 metres
- Calculating characteristic impedance (Zo) of unknown twin cable
- Broadband Powerline Communications: Where are we now?

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Our Cover this month

The cover photo shows Hayden VK7HAY after having installed his Diamond X-200A antenna onto the mast. See Hayden's review of the equipment page 18.

All should note the use of appropriate safety equipment when climbing a tower.

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Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the National Office on receipt of a stamped self-addressed envelope.

Back Issues

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Disclaimer

The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Editorial comment

Peter Freeman VK3KAI

March has been a busy month for many. Many clubs, smaller groups and individuals made the effort to establish stations in the field to participate in the John Moyle Memorial Field Day. Did you participate, even if only to give those in the field some points through your contact/s? If you did not participate, consider planning ahead so that you can "enter the fray" next year. Moving some of the radio equipment out into the field for a contest often brings interesting insights. It certainly improves your preparedness for unexpected emergencies, such as the devastation wrought in Innisfail and surrounding region by Cyclone Larry. I am sure that you will all join me in wishing everyone involved a prompt recovery, even if it will take weeks or months.

As noted in the VK3 notes, there have been many stations using the AX prefix for the month of March, in celebration of the Melbourne Commonwealth Games. Amateur Radio Victoria members have been operating the special event callsigns of AX3MCG and AX3GAMES. I am sure that the QSL cards will be in great demand from around the world.

The magazine team is planning something special for next month, as a trial. I will not reveal details now, but expect to see some special coverage of the Commonwealth Games stations and John Moyle Memorial Field Day activities.

Our WIA

One important aspect of the operations of our WIA is often overlooked by many people with whom I have interacted to date. Much of the work of the WIA is conducted by volunteers. Our organisation is not like those of the ARRL or the RSGB, both of which are much larger organisations with paid staff members in addition to the volunteers involved. The WIA has only a very small paid staff. The rest of the work is done by volunteers. Many of the team are undertaking full time paid jobs and contributing to our hobby in their precious spare time. This aspect applies to the organisation at many levels, including the Publications Committee. As a result, some issues may take longer to resolve than if we had many paid staff members.

Magazine production

This issue of AR represents the third that I have guided as Editor. It has been an interesting experience, getting up to speed and attempting to meet the deadlines. I have received several enquiries from authors regarding when their contribution will appear in this journal. I thought that perhaps you all may be interested in how the whole process of production is organised.

Authors interested in contributing should firstly download the Instructions to Authors document from the AR section of the WIA website (http://www.wia.org.au/armag/index.php – look for the link on the left hand side of the page). This document will outline how you can make our job easier through the following stages. Then prepare your article and submit the document and any images to the Secretary of the Publications Committee. Receipt of the article will be acknowledged – you have reached the first milestone.

The article will then be passed on to either myself or to one of the Technical Editors for consideration. At this stage, several things could occur: the article may be rejected as unsuitable; it may require clarification from the author, or minor editing. Once the Technical Editor has approved the item, it is returned to the Secretary for the next stage of registration and the preparation of images and drawings into a form suitable for publication.

Once these steps are completed, the article is added to the pool of available articles and sent on to me for consideration. I usually attempt to publish first those articles that have been in the system the longest, although there are a variety of reasons why an article may be given a fast track. The whole process may take several months.

Each month, I will choose several articles from the pool and forward them to our publication house for inclusion in the next month's issue. The article is prepared into the final layout and returns to myself and some other team members for proof reading. Once finalised, the whole of the issue is forwarded to the printer. About 2 weeks later, the magazine appears in your mail box, all going well.

Until next month, may you all enjoy your radio activities.

Regards
Peter
VK3KAI

What is an Amateur?

Michael Owen VK3KI

It is a question worth asking, because every now and then one hears someone say that a person is not a true amateur or that is not true amateur radio.

Since 1947 the International Telecommunications Union has been a specialised agency of the United Nations. However, the ITU is very much older than the United Nations, first formed as the International Telegraph Union in 1865 following the signing of the International Telegraph Convention in Paris intended to facilitate the international interconnection of the telegraph.

The first International Radiotelegraph Convention was signed in 1906 in Berlin.

In 1927 the International Radiotelegraph Conference in Washington D.C. allocated bands to various radio services, including the amateur service, and annexed what was called General Radio Regulations to the International Telecommunications Convention. Article 1.[14] of the General Radio Regulations defined an "amateur station" as:

"A station used by an "amateur", that is, by a duly authorised person interested in radio technique solely with a personal aim and without pecuniary interest."

Then at the Madrid Conference in 1932, the 1865 International Telegraph Convention and the 1906 International Radiotelegraph Convention were combined to form the International Telecommunication Convention and the International Telegraph Union became the International Telecommunications Union, since then the international organisation responsible for the international regulation and coordination of the radio frequency spectrum.

It is interesting to reflect on how much has changed in the use of the radio frequency spectrum in the 79 years since the Washington Conference.

How much it has changed is illustrated by the fact that the highest frequency band allocated to the amateurs then was 56,000 to 60,000 kilocycles.

It is trite to say that amateur radio is as old as radio itself.

While the technology has changed, how much has 'what is amateur radio' changed?

Since 1927 the General Radio Regulations, now the Radio Regulations, have grown significantly, and the need to regulate new uses, such as higher frequencies and the frequencies and positions of satellites have seen the Regulations grow ever more complex.

But the definition of "amateur service" is not startlingly different.

Today that definition

Amateur Service: *A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.*

The essential elements of the 1927 definition, the concept of *a duly authorised person interested in radio technique solely with a personal aim and without pecuniary interest* has remained part of the definition since the first international regulation of the amateur service.

Inserted into the definition in the conferences after the Second World War was the purposes of the amateur service, *self-training, intercommunication and technical investigations.*

I think the specification of the purposes of amateur radio is very important. It reminds us that learning, the "self training" is as much a part of amateur radio as is "intercommunication", the simple art of communicating, which in turn is as much a part of amateur radio as is "technical investigation".

Amateur radio is not only the hobby of an elite few who have the highest technical qualifications. It is the hobby of those who are fascinated by the art of communicating, be it in a contest, recognised by an award, or simply talking across town or across the world. It is the hobby of those who see it as a means of learning, and of applying what they are learning.

What amateurs do must change as the means of using the spectrum change now interfacing with the Internet.

When the International Amateur Radio Union's Future of Amateur Radio Committee published its 17 page Discussion Paper in April 1996, seeking to formulate an international position to the international regulation of the amateur service and inviting comments from societies and individuals, among very many other issues that it addressed, it offered the suggestion that Morse Code should cease to be a treaty requirement for the qualification of an amateur to operate below 30 MHz. That resulted in an incredible number of individual responses and even "petitions", arguing that the removal of Morse code as an essential element of the qualification of radio amateurs was striking at the very heart of amateur radio, and was totally misconceived.

Others saw Morse code as a barrier to entry, technically no longer relevant.

Yet without the Morse code requirement, and with many new initiatives to attract new amateurs around the world, in Australia with the introduction of a new entry level licence, the Foundation licence and, currently, the revision of the regulation of the amateur service to encourage the better use of the Internet by amateurs, we are at last seeing a new wave of people joining the ranks of radio amateurs.

So, what is an amateur?

Since "amateur" was first formally defined in a 1927 international treaty, better defined after World War II, 'what is an amateur' has not changed at all.

When first introduced into our country, the "Z" call was as much an amateur as the "Full Call", even though then as a "Z" call I knew that some "Full Calls" didn't think so. Today, the Foundation licensee is as much an amateur as the Advanced licensee.

Let us always remember that the essential elements of the most elegant and the most important definition of what we are covers our different interests and different levels of qualification, with that most important element of self-training encouraging all of us as we enter at one level to aspire to a higher level, but always as someone "interested in radio technique solely with a personal aim and without pecuniary interest."

Or, to put it another way, I know that amateur radio is that aspect that interests me, but I have to remember that amateur radio is also what interests you.

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WIA News

ACMA issues Foundation licence number 250

During the week of February 27, four short months since its introduction, the Australian Communications and Media Authority, ACMA, has issued the 250th Australian Foundation licence. This period includes the Christmas break when there was very little training and assessment activity.

The WIA is currently processing assessments at a rate averaging around 40 each week and at the end of the week commencing February 27, had processed just over 400 packs. So we can look forward to seeing ACMA issue the 500th licence in the not too distant future.

Meanwhile, the number of clubs offering training and assessment for the Foundation licence continues to grow and the WIA has received a number of applications for Assessor training from members of clubs yet to commence Foundation licence training.

Training of additional Assessors will commence shortly and on completion the WIA will have around 200 qualified assessors.

A Foundation Licence course in Melbourne with room for some more candidates

The Frankston and Mornington Peninsula Amateur Radio Club (FAMPARC) in the Bayside area of Melbourne, are now offering places for their April Foundation Licence Course. The course will have a duration of 4 weeks and an exam day on the following Sunday. Start date is Thursday, April 6th at 7.30pm.

The club was offering only 10 places at its excellent learning facilities at St Leonards College, Patterson Lakes.

So if you are interested in studying for your foundation licence and/or becoming part of a great amateur radio club, contact Peter VK3TQ on BH (03) 9644 5733 or 0438 093 318 mobile before 8.30pm.

Commonwealth Games Special Event Stations

On air for the entire month of March were special event stations - AX3GAMES and AX3MCG - being activated by members of Amateur Radio Victoria in celebration of the Melbourne Commonwealth Games. A roster of about a dozen on Phone and CW have volunteered for AX3GAMES, while AX3MCG is being operated by top DXers Peter VK3QI on CW and David VK3EW on phone.

While AX3GAMES and AX3MCG are the only special event callsigns issued by the ACMA, it has also released the alternative AX prefix for use by all VK stations during the games period 1-31 March.

TransACT announces BPL trial in Canberra

Howard Dahdah, of PC World, reported this week that Canberra telecommunications provider TransACT is to commence a trial of BPL.

Dahdah reports: "TransACT CIO and general manager Carsten Larsen said the company is looking at delivering the Broadband over Power Lines (BPL) service to office buildings, because many of the houses and medium-density units in Canberra and Queenbeyan already have TransACT's fibre cables running past them".

"The first test site for the service, which will deliver download speeds of 200Mbs on a shared network, will be TransACT's own head office, Larsen said. "The engineering is being drawn up. If we go from here to a connected environment, we can take the lessons from here to a live site. We have to feel all the bumps and problems with it. But we will give it a push and see if it works."

Should the trial prove successful, TransACT propose a commercial rollout later this year.

WIA Awards Office is moving

Malcolm K. Johnson, VK6LC, WIA Awards Manager, advises that the WIA Awards Office is moving to a new larger office.

The transitional period will be between 1 March and 15th April 2006.

All postal, email applications and updates will be responded to but not processed for this period, but if you have not received any response by the 15th. April please re-submit your request.

Mal apologises for any delays.

Hams help out following mud slide

RSGB reports that radio amateurs have helped coordinate rescue operations after a devastating mud-slide on the Philippine island of Leyte buried an entire village.

More than 1,800 people are thought to have died when the village of Guinsaugon, on the southern part of Leyte, was engulfed by mud on 17 February following a week of torrential rain and a small earthquake. The International Radio Emergency Support Coalition (IRESC) has been supporting the relief effort by providing communication links between the disaster area and the International Red Cross. The IRESC specialises in connecting up traditional ham radio systems - HF transceivers and VHF/UHF repeaters - with Voice over Internet Protocol technology over the Echolink network.

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Errata:

In the review of the book *Outback Radio from Flynn to Satellites* by Rodney Champness, Rodney's callsign was incorrectly cited in the heading text. His correct callsign is VK3UG. Interested readers should note that Rodney had articles on *The development of radios in the Flying Doctor Service* published in the September and October issues of AR. Please note that the book is available from Rodney (QTHR) for $39.99 plus $8 postage within Australia.

The Elecraft T1 Kit

Build a super-compact portable 20 W auto-tuner for HF and 6 metres

Chris Meagher VK2LCD

For some time since building an Elecraft K2 transceiver I had been looking around for a suitable small tuner for backpacking and other low-power field operations, that would suit both the K2 and my FT-817. At first, I imagined buying a ready-built manual tuner. Another possibility considered was building a unit, from scratch or from a kit, with a Z-match or reversible L-match the most likely options.

When the Elecraft T1 20 W auto-tuner kit was launched in 2005, it didn't take long to decide this was it; I already knew first-hand about the high standard of Elecraft's design, parts, instructions and back-up. The idea of an auto tuner was something I hadn't considered at first, but it seemed to make sense with the advantage of speed, and built-in power and SWR indication. Also in the equation was a keenness for kit construction – bags of parts and the smell of resin!

Construction

The kit arrived from the US via the post in five days and, thankfully, no duty or GST to pay. On the same evening I began the recommended checking of the parts inventory and everything was there. The first step is to solder the BNC connectors to the main board. This requires some instant heat, and for the job I used an 80 W iron with chisel bit.

The rest of the soldering is mostly detailed work and the boards are quite densely packed with components. A fine bit, temperature-controlled iron is ESSENTIAL. Don't even think about working without one. Also, small diameter solder is needed. I used 5% silver Multicore brand, 0.71 mm diameter.

There are some surface mount devices but these were not a problem as they come pre-installed. The only component requiring static protection is the micro-controller. The boards are double-sided with all holes plated through. You need to work fastidiously, and double check the identity and placement of components. They can be very difficult to remove once soldered. I used a magnifying visor throughout the assembly and a hand lens to check in fine detail for shorts and cold joints. Of course, there weren't any!

There are two boards. The main one holds seven inductors and seven capacitors for the L-C network, 15 relays, a 28-pin micro-controller, the SWR bridge and ancillary components. The relays are latching, so that power is only consumed during tuning. This allows the unit to run easily from a 9 V battery. The small control board plugs in piggy-back on the main board and has the control switches and indicator LEDs.

The only problem I encountered was a modification by Elecraft to beef-up the SWR bridge. This required replacement of two ¼ watt resistors with 1 watt. Fortunately I had only put one of them in before I found out about this, but unsoldering was something I didn't like. The modification also involved using two stacked toroid ferrites instead of one, and this part was fiddly to fit into a tight space. Patience and perseverance paid

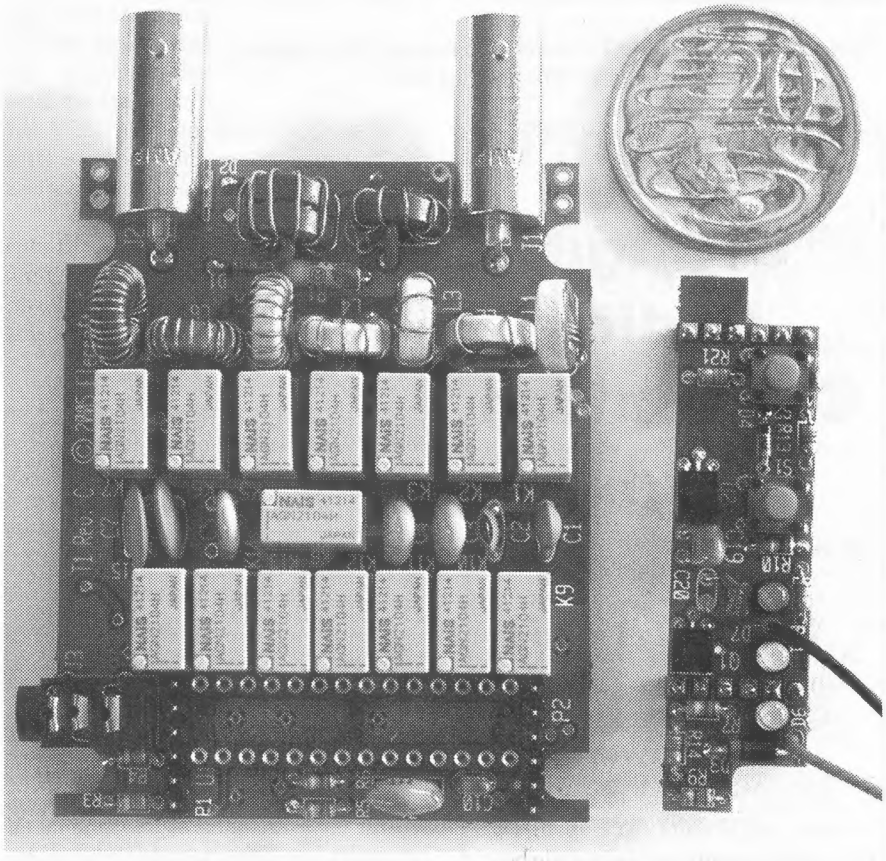


Photo 1 - T1 circuit boards with the processor not installed. The small board plugs into the main board over the top of the processor.

Photo 2 - The completed T1 installed in its case. The battery fits into a compartment in the back.

off in the end and, after three sessions of building, there it sat in one piece on the bench.

Testing

The detailed assembly manual provides tests at various stages to confirm all is well. Once the kit is completed, the micro-controller is able to test the L-C settings and relay function with a procedure which reports to you in Morse code, either visually via the LEDs or with a Morse-encoded RF signal re-routed back into the transceiver. Amazing!

The moment of truth: insert the battery and start the test procedure. My unit worked first go, no hitches. I connected the G5RV and the T1 tuned across the HF range with little effort. The table below summarises the results.

R and X are the radiation resistance and reactance of the untuned antenna, measured with an MFJ259B analyser. (+X indicates inductive and –X indicates capacitive reactance.)

Freq MHz	SWR un-tuned	R ohms	X ohms	SWR tuned	Time to tune (secs)
3.600	1:3.7	69	–90	1:1.2	2
7.100	1:2.8	23	–32	1:1.1	2
14.100	1:1.6	88	0	1:1.2	3
21.100	1:4.7	9	+4	1:1.1	4
28.400	1:2.4	24	–75	1:1.1	2

The T1 holds settings in its memory, and will tune much faster on re-tune providing that it sees an SWR of 1.5 or less. This is very handy when re-tuning within the same band as the time taken is usually less than a second. You can set the memory tune threshold at an SWR of 2 to speed up tune with very touchy antennas. A power level of 0.5 to 1 watt is fine to initiate an auto-tune, using carrier or sideband.

Overall assessment

While the T1 tuner is not a particularly complicated kit, it is definitely not for the inexperienced or hasty person. But for the keen kit builder and low power portable operator, a 20 W tuner measuring 121 x 63 x 20 mm and weighing less than 160 grams with the battery installed is indeed an attractive proposition.

Don't be put off by the idea of winding toroid inductors. It seemed to me a bit daunting at first but, after winding a few of them, it became familiar and almost therapeutic.

The component quality is very high, in keeping with the standard set by Elecraft with the K2 transceiver. The plated-through circuit board is a beautiful thing. As with all kits, once you've built it, the construction excitement and challenge is gone, but the T1 is likely to continue to reward your efforts with its superbly implemented user interface. Everything is there on the front panel, including the basic operating instructions. Usually I'm pretty keen on meters to indicate things like power and SWR, but the simplicity, reliability and space saving of the LED indicators in this unit has won me over.

The performance was not tested with any extreme impedances. Judging from user reports it performs well with a wide variety of antennas, including long wires. Personally, I was amazed by its tuning speed and, with the shirt-pocket size and simplicity of operation; it really looks the goods for backpack work. Now I just have to quit my job, get fit and head for the hills.

My experience with Elecraft sales staff was that they are courteous and the service is hassle-free. If you need help, advice, or just want to see what the Elecraft owners are on about, you can join the e-mail discussion group. For kit details, go to www.elecraft.com. Please note that I have no connection with the company other than having purchased their products, and this is an unsolicited review.

ar

2006
Urunga Radio Convention
Easter Weekend 15-16 April

Check out *Urunga Radio Convention* web page for details of this family-friendly event

http://users.tpg.com.au/goldy2/

Calculating characteristic impedance (Zo) of unknown twin cable

Ron Sanders VK2WB

When winding matching transformers, such as baluns, for use from 1 – 30 MHz, the best results are obtained at the high frequency end of the range when the windings are made from transmission lines which satisfy the following matching criteria:

The transmission line should have a Zo = √(Z1 X Z2), where Z1 and Z2 are the input and output impedances. For example, matching a 50 ohm cable to 200 ohms requires a cable with Zo = 100 ohms.

(See the article in *Amateur Radio* July 2005 for more information on winding arrangements.)

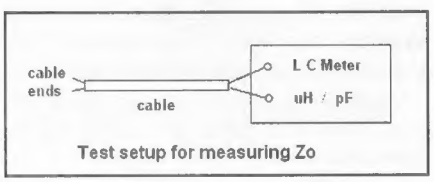
Coax cable characteristics are readily available, but it is often necessary to use twin cable as the transmission line when winding a ferrite toroid or rod as the core of a matching transformer.

Calculation of Zo can be made by measuring the inductance (L) and capacitance (C) of a length of cable.
Zo = √(L/C).

Test set-up

By using an L/C meter which operates at 0.5 MHz or more, and can display µH and pF as three or more significant figures, we can achieve sufficient accuracy for amateur use.

At HF amateur frequencies, the transmission line used for winding should never exceed one metre in length. However, to obtain sufficient significant figures in the measurements of L and C, the cable should be made at least two metres long. Where two individual wires are used they should be kept in close contact so that any air spacing is minimised. A small amount of twisting is permissible to satisfy this requirement, especially with thin enamelled copper wire (ECW).



Test setup for measuring Zo

Measurements

With the cable ends open circuit measure the cable capacitance. Short the ends together and measure the cable inductance. Cable Zo = √(L/C).
Note that L and C must take account of measuring units.

With a 2 m cable the following range of L and C values is to be expected:

L: 0.5 - 2 µH
C: 50 - 200 pF

Some actual measurements are listed below, with accuracy probably 20% or better.

1. 30 AWG twisted pair ECW, 2 m long
   L = 1 µH, C = 200 pF
   Zo = 70 ohms
2. 24/0.2 PVC twin speaker cable (Dick Smith W 2012), 2 m long
   L = 1.6 µH, C = 85 pF
   Zo = 137 ohms
3. 2 x 1.0 mm ECW, 2 m long
   L = 0.8 µH
   C = 180 pF
   Zo = 67 ohms
4. 24 AWG PVC twisted pair, (ex IT 12 pair ribbon cable), 2 m long
   L = 1.5 µH, C = 120 pF
   Zo = 112 ohms
5. 2 x 24/0.2 PVC cable (Dick Smith W 2260), 2 m long.
   L = 1.65 µH
   C = 75 pF
   Zo = 148 ohms

A check of known coax cable was made with an LC meter at about 1 MHz, with the following results:

RG-58, approx 3 m long.
L = 0.9 µH, C = 332 pF
Zo = √ ((0.9 x 10^{-6}) / (332 x 10^{-12})) = 52 ohms

Conclusions

The cables in 1 and 3 would be suitable transmission lines where a Zo = 70 – 75 ohms is required. The cable in 3 above would probably be suitable down to 50 ohms.

The cable in 4 would be suitable for use as a 100 ohm line such as required for a 50:200 ohm transformer.

The cables in 2 and 5 would suit a 75:300 ohm transformer. Most IT and telecom cable pairs have a nominal Zo = 100 ohms at frequencies >1MHz.

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Observations on VHF antenna height and other VHF path curiosities

Felix Scerri VK4FUQ
felixscerri@bigpond.com.au

This article could be titled, "Is additional height really any great advantage in the overall scheme of things?" Conventional wisdom would suggest that, of VHF signals on "normal" terrestrial paths, the higher VHF antenna will always perform better. But is this always true?

Over the last year or so, as part of my never-ending VHF antenna tinkering, I've done a lot of raising and lowering of small 2 m beams on various simple pipe masts of differing heights. In the course of those experiments I've come away with the feeling that additional height is not always as advantageous as one might think. In recent times I've been able to put up two identical Yagi beams on two separate pipe masts of differing heights and adequately spaced to avoid interaction. Using this arrangement, I've conducted numerous evaluations. My observations indicate that, on the longer 'DX' type of VHF path, such as is frequently seen up here in the North, with coastal tropospheric ducting, etc, the 'higher' beam is generally superior; yet on at least one 'moderate' distance path, the lower height beam is superior. That path is to our 'local' 2 m repeater situated on Mt Stuart in the Townsville area, around 70 miles from my QTH at Ingham.

None of my pipe masts is particularly high. My 'short' pipe mast has a maximum height of only slightly over 20 feet. My longer mast reaches about 25 ft. Yet, in rapidly switched comparisons, at least on the path to the Townsville 2 m repeater, the shorter mast always provides the stronger signal, sometimes by several "S" points, as evidenced by indicated receiver signal strength readings from the repeater.

Why? I don't really know. It would be nice to be able to check signal levels with even higher masts, but that option is not readily available to me. However I have checked things with even lower mast heights (around the ten foot level), and signals rapidly drop off at that point, possibly due to the large number of signal-attenuating physical obstructions present (houses, buildings, trees, etc). Perhaps I shouldn't be surprised at this. Interestingly enough, another situation where the "lower" Yagi appears to perform better is in working mobile stations direct. However, strange things do happen at VHF frequencies.

Over the years I've become aware of lots of documented and anecdotal situations in rural areas (especially regarding TV reception), where antennas mounted on high masts and in the clear did not work as well as an antenna mounted in a seemingly bad location. My own observations with 2 m confirm this. Years ago, when the Cairns 2 m repeater was located at Mt Bellenden-Kerr (a very high location), while driving to Ingham from Townsville, along a certain kilometre or two section of the Bruce Highway, around the township of Rollingstone, I was able to access that repeater for a *very* quick mobile QSO!

That path always seemed to exist over the years, but only for a short and defined section of road and, dare I say it, Rollingstone was a long way from that repeater's primary coverage area, especially for a mobile 2 m station!

I've often tried to analyse these strange, unexpected, but reliable VHF paths. There are a large number of possible factors and reasons, ranging from localised ducting effects, geographically induced reflections, 'knife edge' refraction effects, and/or other exotic propagation modes that defy rational explanation, but these mysterious things do seem to happen at VHF frequencies. Perhaps my observation about the improved path to my local repeater with my 'lower' Yagi mast is another example of slightly improbable VHF path complexity and enhancement.

I wonder if others have also observed their own VHF path curiosities. I'd be interested to hear about them.

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It can be tough switching between your 6-over-6 Yagi; your 4 element Quad, your 600' terminated Rhombic, and your full-size 160 meter vertical. Crawling under the desk, wrangling stiff pigtails of RG-213 up to the rig. Even with a coax switch, most have the connectors at all angles, leaving the coax running all over the place, taking up half the desk. And then, you have to be able to reach the switch knob, so all that RG-213 is right there in your face.

So you get all that sorted, you're out when a killer lighting storms occurs, "Did I set the switch to Ground?" If not, will you have a smoking heap of rubble where your rig was.

Help is at hand. The LDG DTS-4 Desktop Coaxial Switch is made for hams, by hams, to solve these very problems.

With the DTS-4 you can instantly switch your rig between 4 antennas with the press of a button. All five coax sockets (4 inputs and one output to your rig) are lined up across the back of the switch, so all the coax can run straight back.

This means the DTS-4 will fit in just about anywhere on your desk. A bright red LED indicates the antenna in use. At a touch of the control buttons, all inputs are grounded, helping to protect your radio from Mother Nature.

Remember that lightning? The DTS-4 can sense when your rig is turned off, and automatically ground all antenna inputs!

You simply run a line from a DC-out port on your rig (most modern rigs have at least one) to the DTS-4 and set it to Radio Sense mode with a simple button-press. From then on you're protected; . Power up and the DTS-4 automatically resets to the last used antenna. Use your radio's auto power off feature and it will even protect you if you forget!

But that's just the beginning! How about remote-mounting the DTS-4, say on the floor under the desk, or even in the basement to keep all that pesky coax at bay, and using a compact remote control box on your operating desk?

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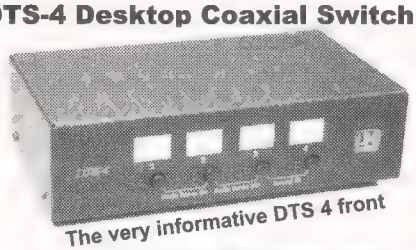
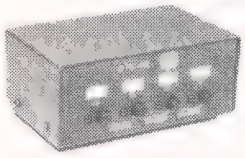
Add the DTS-4 and DTS-4R to your shack soon; it's the modern coax switch you've been waiting for.



The very informative DTS 4 front

The highly organised back



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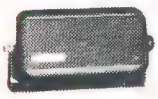

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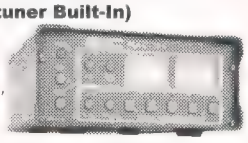

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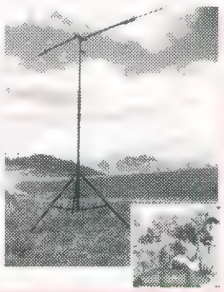

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Try EchoLink yourself

Paul van der Weegen VK2EX

Having been a ham since 1978, I have seen some wonderful transformations in our hobby. I started off on SSB with a converted CB radio, and moved on to bigger aerials and more powerful radios with more bands and features. I first experienced computer interfacing with my uncle VK2DDA and his PET computer playing RTTY, and quickly became hooked on digital communications.

After RTTY came Packet, AMTOR and FAX with a PK232MBX. I had a load of fun. Then came along JVFax and full colour SSTV in its various modes. "What a breakthrough", I thought. A few years later and the sound card revolution started. No longer was there a need to buy expensive hardware, dedicated to only a few modes. You could now easily hook up your computer to the mic and speaker sockets, and get onto the latest digital modes.

I found PSK31 to be a fantastic meal for my digital appetite. I experimented with many stations on many modes and was even able to hold a two way contact with an American radio amateur on 10 metres with 0.5 watt of power through the beam. There are many other modes like PSK31, all running through the sound card.

A few months ago I found myself with a dilemma. My 13 year old daughter cuddled up to me one night on the couch and asked if she could have a room to herself. Well, what was a dad to do but look at my shack and realise that my daughter had more right to a room of her own than my radio gear. So, I packed up the gear and gave ham radio a rest for a few years (or so I thought).

However, my need for ham radio finally got the better of me. I went in search of other activities to entertain myself and quickly found K1RFD's EchoLink again. I had played with EchoLink a few times some years ago, but considered it just like MSN Messenger and VOIP (Voice over Internet Protocol), so I was not initially taken by it. But, after a good look over the program and talking with a friend of mine, I found it too could be hooked quite simply to a transceiver and used remotely.

This revelation caught my interest and, for the first time in about 10 years, I pulled out the soldering iron and resurrected my old JVFax modem which I had built all those years ago. I managed to hook up the old Dick Smith Commander to the computer, hung a 'rubber ducky' 2 metre aerial off the bench, and quickly found I had some serious feed back problems!

Not to be beaten, I soon realised that it would be necessary to decouple the radio and computer electrically. I purchased four small audio transformers from the local electronics store and wired them between the radio and the computer on the audio lines. It worked.

I was most impressed to find that I could now talk to many people in many countries from my hand-held in the kitchen, the back yard, the lounge room and even 'maritime mobile' from the pool on an air mattress.

I have since made many improvements to the system, including building a new half wave J-pole antenna and hooking up my old FM900. The FM900 is a good radio for this type of work as it has a time-out timer built-in which is very necessary if you are going to consider using this system remotely and unattended.

My wife Sheralyn, VK2LUV, and I have been chatting for years on a 2 metre simplex frequency to keep in touch, so I decided that quiet frequency would be ideal for the EchoLink experiment. Well, that frequency is far from quiet now! We still use it, of course, but the contacts I have made and the new friends I have found on this fascinating system have revitalised my interest in good old fashioned rag chewing, and ham radio as a whole. Every day on the 10 km drive to work I talk with a fellow EchoLinker in the UK, sometimes mobile to mobile. Let's see you do that on MSN or Yahoo Messenger, Skype or CQ Phone.

The technology in this program is, quite frankly, jaw dropping. You can buy a ready made interface or, with the simple home brew interface I have outlined in this article, you can have full DTMF remote control of the program via your radio. You are able to connect to other stations, disconnect, check node status, and even disable and enable the link. The system has time-out timers that you can adjust to suite your needs. You can also control what type of users you will allow to connect to your system, such as allow only RF links, single computer users, repeaters only, or everything.

The EchoLink system is also well regulated. When you first download the program you are asked for your call sign and a password. Your call sign is then verified and it is confirmed that you are a licensed amateur before you are be able to connect to the EchoLink server. This helps ensure that only hams are on the system.

If you are considering taking the leap into something different, and have a spare computer and preferably a broad band internet connection, please give this technology a good look. You might be very surprised and impressed as I have been. This is what ham radio for me is really about: Experimenting with new forms of communications. With the current solar activity, this seems the perfect way to keep those skeds alive.

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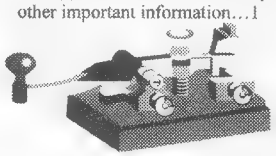


The VK5BR-X antennas

Some modified ideas on how they work and how they perform

by Lloyd Butler VK5BR

(Further experimentation has revealed more about the causes of rise in antenna resistance. Also we see that more radiation can be achieved by unbalancing the antenna circuit.)

Earlier estimates of radiation efficiency in the X2/X3 antennas were based on measuring the difference between total antenna resistance and series coil loss resistance. The difference was thought to be radiation resistance resulting from the crossed E and H fields. It is now clear that this difference is due to other factors and the antennas are now not considered to be operating in a crossed field mode.

Further experimentation has also shown that, rather than be enhanced by crossed fields, the radiation can be increased by connecting the antenna circuit so that it is out of balance. This causes a common mode current component in the feeder, particularly high at the antenna end, so that the antenna itself forms an efficient top loading element for the common mode current as a radiator.

Foreword

The original concept of the X antennas was based on the controversial crossed field theory. The open magnetic fields from coils in series with the short dipole legs are arranged so that they interact with the electric field between the two dipole legs. It was considered that at least part of these fields would be at right angles to the electric field and, because the current through the coils must be in phase with the voltage across the antenna resistive load, the magnetic field from the coils must also be in phase with the electric field across the dipole. This constituted much of the requirement for crossed field antenna operation. For more detail, refer to my first article on the X antennas published in *Amateur Radio*, July 2004.

The simplest form of the X antenna is the X2 connection shown in Figure 1. Here we have a balanced dipole antenna, about 2% of a wavelength, loaded with two series coils and fed via a balanced but tunable line controlled by a Z Match antenna tuner.

The antenna dipole capacitance is very low and somewhat less than 10 pF for the higher frequency HF antennas, to a little more than 10 pF for the 80 metre antenna (so we see reactances of over 1000 ohms at 14 MHz and 3000 ohms at 3.5 MHz). The total inductive reactance of the two coils in series is selected to be close to the capacitive reactance of the

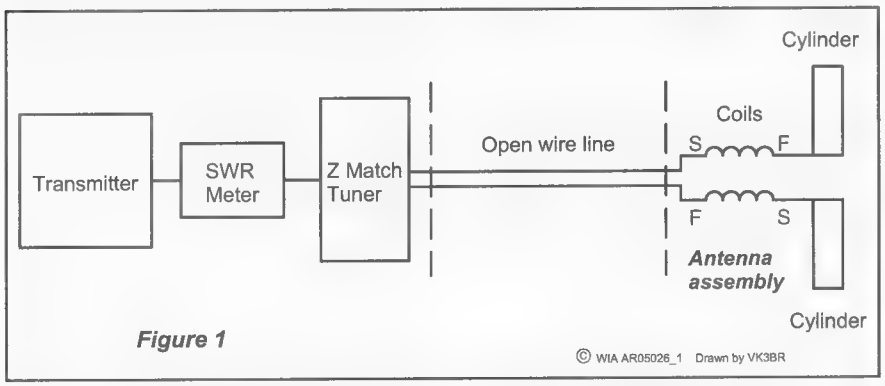


Figure 1 - Tuning arrangement VK5BR_X2 antenna.

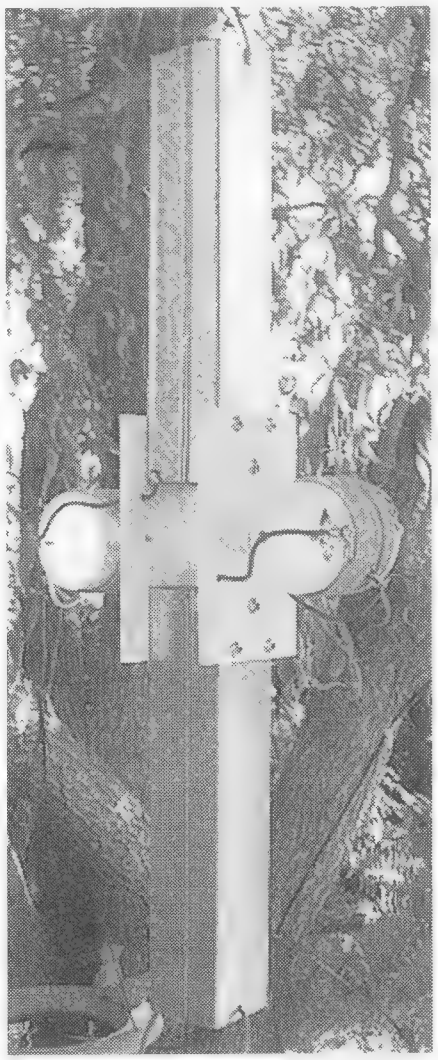


Photo 1 – 20 m X3 antenna

Editor's note

This article first appeared in a reduced form in the December 2005 issue of AR. Unfortunately, several errors crept into the presentation of the material. Several people, including the author, noted the errors. To ensure that all are happy and can read the article as a more comprehensible story, we are publishing the complete article. We have previously noted the errors and have apologised to Mr Butler.

Peter VK3KAI, Editor

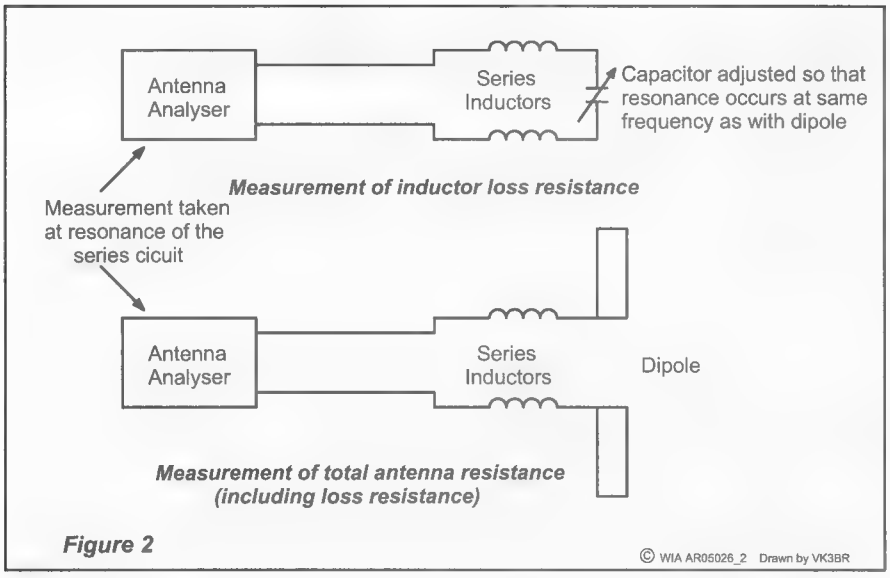

Antenna Analyser
Series Inductors
Capacitor adjusted so that resonance occurs at same frequency as with dipole
Measurement of inductor loss resistance
Measurement taken at resonance of the series cicuit
Antenna Analyser
Series Inductors
Dipole
Measurement of total antenna resistance (including loss resistance)
Figure 2
© WIA AR05026_2 Drawn by VK3BR

Figure 2 - Measurement of coil loss resistance and total antenna resistance.

dipole at a frequency within the band of operation. Precise equality between the two reactances is not imperative as resonance at the frequency of operation is made with corrective reactance (where necessary) reflected up the balanced line by adjustment of the Z Match.

The total load resistance of this antenna has been assumed to be the sum of the loss resistance in the coils and the load resistance presented by the antenna itself resulting from electromagnetic radiation and induction into nearby objects. Measurement of coil loss resistance and total resistance of the antenna series circuit is shown in Figure 2.

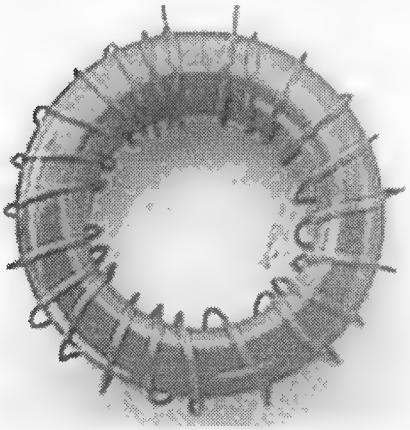


Photo 2 - Toroidal coil.

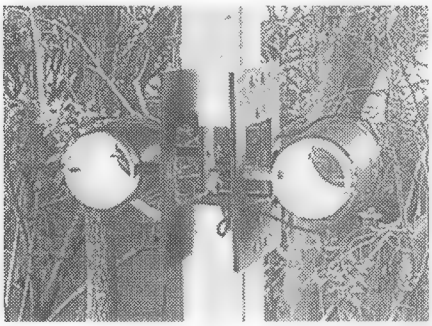


Photo 3 - 40 metre antenna assembly with centre of separating plates cut out.

Based on formulae to calculate radiation resistance, a dipole of about 2% of a wavelength would have a radiation resistance of around 0.1 to 0.2 ohm. So, in measuring total resistance of the antenna, a resistance little different from that of the coil loss resistance would be seen.

Coil loss resistance varies between around 4 ohms for 10 metres to 10 ohms for 80 metres. However, in making measurements, total resistance considerably higher than the loss resistance has been recorded in the region of 15 to 40 ohms. Some of this can be shown to be induction into objects or earth which are too close to the antenna. But the remainder has been taken as radiation resistance very much higher than that of the calculated figure for the basic dipole and assumed to be due to the interacting E and H fields.

One questionable aspect of this explanation is that the antenna still seemed to work when the coils were rotated by 90 degrees away from their maximum line of field. This was discussed in my article in *Amateur Radio*, April 2005 and explained away by virtue of the fact that a field around an open coil spreads at all angles.

However, it was suggested to me that the theory of interaction could be tested by substituting the open coils with two coils of equal inductance but wound on toroidal iron dust cores. This would confine their magnetic fields essentially to the toroidal core and limit most of the interacting magnetic field.

So I wound two coils (Photo 2), 6.5 µH (23 turns) on 50 mm T200 iron dust cores and tried them on both of the 20 metre X3 antennas I had, but used the X2 connection because I needed to take resistance measurement. The series loss resistance measured at resonance, with a fixed capacitor substituted for the antenna capacitance, proved to be 1 or 2 ohms less than the open coils.

Assuming that all the magnetic field from the toroidal coils was confined, the resistance reading with the antenna dipole connected should have been almost the same as the previous coil loss resistance reading. Not so! In fact, the total resistance with the toroidal coils was considerably higher than with the open coils. This resistance on one antenna, resonating at 14.8 MHz, was as high as 24 ohms, nearly three times the loss resistance. It almost suggested that the circuit with the highest unloaded Q gives the highest radiation resistance.

Further to this, when powered the antenna seemed to be operating and radiating at least as well as (if not better) than when using the toroidal coils.

All this leads to assumption that my original theory for the X2/X3 antennas operating in a crossed field or field interacting mode was wrong. There had to be some other explanation why the apparent radiation resistance is raised well above that of around 0.1 or 0.2 ohms derived from a common formula for the 2% wavelength dipole.

Dielectric loss induction loss

My previous test procedure has been to assume that losses in the antenna circuit were essentially due to losses in the series coils. However, as discussed above, the high Q creates a very high impedance across the capacitance of the antenna. Quoting the example of a series resistance of 20 ohms and a Q = 50, the shunt resistance across the capacitance at resonance is 20 x 50 squared = 50,000 ohms. Such resistance could, in part, be due to excessive dielectric loss resistance in the insulating plates separating the dipole elements.

It seemed strange to me that the series resistance measurement on the 10 metre antenna was so much lower than on the 20 metre antenna. The only difference was that the insulating plates for the 10 metre antenna were made of plexiglass (which appears to be a form of polystyrene) whereas those for the 20 metre antenna were made of hardboard. So I re-made the separating plates for the 20 metre antenna in plexiglass and this lowered the series resistance by about 8 ohms to a value nearer to the loss resistance determined for the coils.

I then operated on the 40 and 80 metre antennas. In these I cut the centres out of the hardboard separating plates so that a skeleton plate was left sufficient to fix the dipole elements apart and provide mounting for the coils (see Photo 3). This lowered the series resistance of the 40 metre antenna by 6 ohms and the 80 metre antenna by 5 ohms.

The resistances of these two antennas were still considerably higher than the coil resistances, but at these lower frequencies it appears that considerable coupling takes place to surrounding objects and particularly earth. In particular, the resistance of the 80 metre antenna rises considerably as its height above the ground is increased, increasing to values as high as 44 ohms.

Whilst I was on the job I thought I should check out other available insulating materials, so I also tested the 20 metre antenna with plates made from PVC sheet and the 10 metre antenna with plates made with polyethylene sheet. These gave similar results to the plexiglass. It was only my hardboard which clearly showed the high dielectric loss.

These latest tests have shown that this added resistance is more to do with dielectric loss between the dipole plates and induction loss than the result of crossing or interacting of the E and H fields as previously assumed.

The induction loss into earth and other objects is particularly apparent for the lower frequency antennas. This could be pure absorption loss but it could also be induction into other structures which re-radiate. This latter idea would seem to have real significance if the field spreads around another antenna wire which happens to be resonant near the frequency of the local field or is harmonically related.

E-H phase testing

The design of the X2/X3 antennas was originally based on the in-phase relationship between the H field generated by current through the coils and the E field generated across the dipole plates. I checked this relationship with probes connected to a dual trace CRO. I have to say this was a bit tricky as the CRO leads pick up stray longitudinal voltage which can give false indication of what is being read.

Figure 3 shows the arrangement I eventually used to carry out these tests on the 40 metre X2 and X3. As shown on the diagram, I cast aside the usual high impedance probes and used direct connection to the CRO inputs across a very low terminal resistance which discourages stray signal pick-up.

The H probe, which I poked near the end of either of the coils, had a few turns around a ferrite rod and terminated in a very low resistance (10 ohms) so that the voltage fed to the CRO gives a picture of the current induced from the magnetic field.

The E probe was a short dipole which was terminated in as low a resistance as possible, but sufficient to get a reading on the CRO when the antenna was fed from the highest level available from my 'sig-gen'. By using this and isolating with my candelabra balun to reject longitudinal pick-up, I was able to get sufficient pick-up of the antenna electric field by holding the dipole a few inches away from the centre of the antenna.

The tests were carried out for both the X2 and X3 connections and sourced with a signal generator fed direct to the antenna input as well as using the transmitter output fed via the Z Match and a short length of open wire balanced line. The tests confirmed the in-phase relationship required.

Some interim conclusions

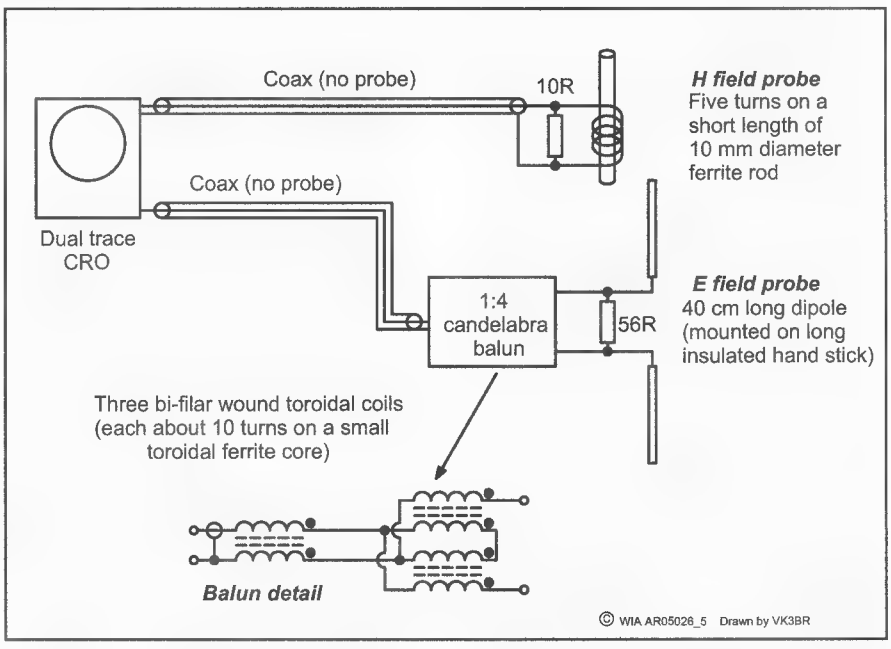
Referring to previous articles, I had assumed that the considerable rise in series antenna resistance was due to the crossed field condition set up by interaction between the E and H fields. However, the more recent tests show that is not the case and the antenna radiation is not being enhanced to a significant degree by the interacting fields. I have to assume one of the following:

(1) The fields are not correctly oriented or not in phase and my testing procedure to monitor this was inadequate in verifying this.

or

(2) The fields are oriented suitably for the crossed field condition but they do not produce the degree of radiation enhancement which has been promulgated as characteristic of a crossed field antenna.

Either way, I cannot continue to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10R
H field probe
Five turns on a short length of 10 mm diameter ferrite rod
Coax (no probe)
Dual trace CRO
1:4 candelabra balun
56R
E field probe
40 cm long dipole (mounted on long insulated hand stick)
Three bi-filar wound toroidal coils (each about 10 turns on a small toroidal ferrite core)
Balun detail
© WIA AR05026_5 Drawn by VK3BR

Figure 3 - Measurement of phase between E and H fields on X2/3 40 metre antenna.

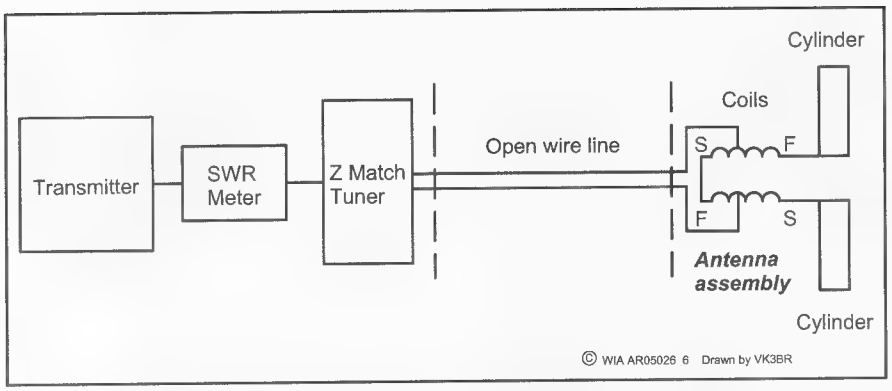

Figure 4 - VK5BR_X3 antenna tuning and matching system

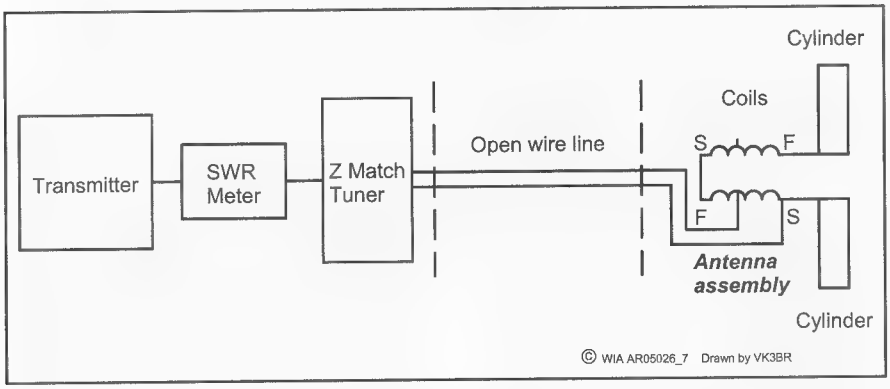

Figure 5 (X3U) - X3 antenna tuning and matching system with antenna circuit unbalanced.

classify the antenna as working in a crossed field mode.

Actual radiation resistance is clearly much lower than previously assumed and difficult to quantify as a means to derive radiation efficiency. Claudio Re I1RFQ tried a different method. He carried out some field measurements on a 10 metre X3 antenna in comparison to a ground plane reference antenna. He derived figures of 10 dB down and an efficiency of the X3 as 10 %. In amateur radio terms this represents about 1.5 S points down and seems to agree with some test reports I have received at 1 to 2 S points down on a full size antenna. Of course this was the original balanced X3 antenna and we are going to look further at what happens when it is put off balance.

The X3 antenna unbalanced

The original balanced 40 metre X3 antenna system is shown in Figure 4. The antenna is driven in its balanced form via open wire tuned line and a Z Match Tuner. In this arrangement, the antenna has been given signal reports around two S points below the level of a reference end fed half wave inverted V antenna with its apex about 10 metres above the ground. Received levels are also several S points below that from the inverted V. Considering that I now believe there is no enhancement from crossing E and H fields, these figures seem consistent with those which could be predicted from a simple dipole.

Much of the information gathered for the EH antenna seems to point to best performance when the antenna has a degree of unbalance to generate a longitudinal (or common mode) current in the antenna system. In both the L+T and Star EH antennas one dipole leg is directly connected to the braid side of the transmission line. For the L+L EH antenna we found it necessary to wind one inductor with fewer turns than the other. When the Star antenna was tried in balance, it didn't perform so well.

Following along this theme, some tests have been carried out to see what happens when the X3 antenna circuit is deliberately unbalanced making it look more like the type of circuit used in the Star EH antenna which has one dipole element directly connected to one leg of its transmission line. I tried several connections using the coils as they exist with their fixed taps. The connection arrangement shown in Figure 5 seemed to produce the best field strength result. I will give reference to this antenna arrangement as the X3U.

Using this X3U arrangement there was still field measurable around the dipoles but much less than for the balanced connection of Figure 4. However, using an H field detector with LED display, I was able to track consistent magnetic field right down the length of the transmission line from the antenna to the Z Match output. This was clearly caused by unbalance of current between the two legs of the line.

The X3U antenna was hung about two metres above the ground with the feedline on average about 1.5 metres above the ground. There was seven metres of feeder in open space plus four metres entry under the car-port and shielded by its steel roof. On test, the received level now appeared slightly higher than the Inverted V antenna. On transmitting, I received several signal reports from stations on the east coast of Australia. These reports indicated similar signal levels being transmitted from either antenna. Further reports on another day from a network of stations put the X3 at a higher level than the Inverted V.

From the tests, I conclude that by putting the short balanced dipole out of balance, the field strength is increased from that inherent to the short dipole to something close to that of a full sized half wave antenna.

What I think happens is that the tuned dipole takes over the role of being prime radiator to providing a differential termination for the transmission line. But because of the unbalance, a longitudinal (or common mode) current component also runs on whatever length of line is now left without a balancing or common mode rejecting interface. This current tends to be quite high at the antenna end of the antenna system compared to a base loaded antenna system which has very low current at its apex. One might consider that the dipole, resonated with its inductors, forms a sort of top loading function to the common mode current component.

In the May 2004 issue of *Amateur Radio* concerning EH antennas, I discussed how the unbalance leads to unequal dipole leg currents via capacitance to earth. Voltage at the dipoles is multiplied by the very high

Q of the shortened antenna circuit and this leads to multiplication of those currents.

I figured that more measurement might reveal how the longitudinal current component might vary over the length of the line. It did seem to me that if the antenna coupling were set such that the dipole circuit loads the transmission line with resistance equal to the line characteristic impedance, current in the line (even if unbalanced) would possibly be fairly constant over its length.

I was able to monitor more carefully the relative strength of common mode current right down the line to the X3U by sliding a large ferrite toroidal core over both wires of the pair and coupling the core to a milli-ammeter with detector. The tests showed maximum common mode current at around one quarter wavelength down from the antenna and at about three times the current near the antenna input and the Z Match Tuner output. However, the current maximum could be shifted to the antenna entry point by shifting the location of the Z Match tuner so that the open wire line section was seven metres long and less than ¼ wave. In this case, the current was near constant to about four metres down the cable, and falling to a low value at the output of the tuner. Despite this, the former test connection, with the longer line, produced higher signal level reports on air test.

I then set about repeating the experiment for the 20 metre and 80 metre X3 antennas using the out of balance connection. Even better for these antennas, the common mode maximum was at the topmost end of the open line where I figured it could be most effective. For the 80 metre test, the common mode current was almost constant over the 13 metre length of line.

One objection raised for allowing the feeder line to be part of the antenna system in the EH antenna was the interaction between antenna tuning and the length or position of the feeder. The same applies to the unbalanced X3 but tuning correction is easily made in the radio shack using the Z Match Tuner.

Some conclusions

The original design of the X2/X3 antennas was based on the controversial cross field theory. Earlier measurements of high antenna circuit series resistance led me to believe that the antenna was working in this mode. However, more recent investigation has shown that as far as the balanced form of the antenna is concerned, the high value of resistance is due to other factors, not radiation resistance resulting from the crossed fields. I now assume that radiation from the antenna, in its balanced form, is simply that which can be predicted as normal in any dipole.

However, I have shown that by unbalancing the form of the dipole (as for the X3U connection) so that the feedline is activated with common mode (or out of balance) current, the radiation level can be raised to nearer that of a full sized resonant dipole.

So it seems that first setting out to make a balanced small dipole which was supposed to demonstrate how interacting or crossing its electric and magnetic fields could enhance its radiation, we have discovered that it doesn't. But, instead, if we put the antenna circuit off balance, we have a magnificent top loading device for a radiator formed from the feedline out of balance current. But I guess that is what experiments with amateur radio are all about.

Before concluding, a short note on EH antennas seems in order. Having written quite a bit about these and their operation in a crossed field mode, I now have similar doubts about whether this mode is the radiation enhancing factor. From what we have learned about the EH antenna, it's antenna circuit is clearly unbalanced and it does seem to need at least a short feeder tail for best operation. I suspect that the same sort of process takes place as I have described for the unbalanced X3.

References

1. Refer to articles on the VK5BR_X antenna in previous issues of Amateur Radio, November 2004, March and April 2005.
2. Refer to articles on the EH Antenna by VK5BR in previous issues of Amateur Radio, April and November 2003, and May, July and September, 2004.
3. Refer to articles on the X3 and the EH Antennas by VK5BR at http://www4.tpgi.com.au/users/ldbutler/

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WIA National QSL Collection

Ducie Island VP6DIA

Ken Matchett VK3TL

A very welcome donation to the WIA QSL Collection was a Ducie Island VP6DIA QSL. It was donated by one of our top DX-ers and DX-peditionists, Gwen Tilson VK3DYL.

The National Collection now has QSLs from every DXCC country, including all deleted countries, since the start of the Post-War DXCC award in 1947. When North Korea was a much wanted DXCC country some six years ago it was another excellent DX-er, Jim Smith VK9NS on Norfolk Island, who helped us out by donating a P51BH QSL.

Ducie Island is the most isolated of the Pitcairn group of islands, lying nearly 500 km to the east. Ducie Island is a coral islet with an area of 0.7 sq. km. Despite very high coastal temperatures, several storms and enormous pile-ups, the Pitcairn Island ARA, together with several volunteers, managed to make no fewer than 51,000 QSOs during their eleven days on the island.

Footnote: Thanks to all the DX-ers who have already contributed to the Collection. Are there other DX-ers out there who would like to save something for the future through the WIA Collection?

ar

Old Timers turn 30

Ian Godsil VK3JS
Secretary, RAOTC

Today it is hard to ignore the fundamental need of almost every Club you hear about – they all need that extra dollar. However, sometimes you meet one that is successful, has a good Membership base and has stood the test of Time.

Such a Club is the Radio Amateurs Old Timers Club Inc. (RAOTC) which officially celebrated its 30th Birthday on 10th March this year.

The Club was apparently formed in 1975, but the Constitution was not adopted until March 1976, so it is from this date that President Ron Cook VK3AFW reckons the lifespan of the Club.

As slang terms change from time to time, so too do more traditional terms like "Old Timer" in our AR hobby. Traditionally an Old Timer is thought of as an operator of 25 years' standing. This gives the impression of an "old" man or woman, or at least a Senior Citizen; but someone licensed at 20 years of age would be an Old Timer at 45, definitely not an old person!

Our RAOTC Inc. has had good support in its 30 years. It is a national organisation, even though the Committee is Melbourne-based, with strong support groups in VK5 and VK6. It has a monthly on-air Broadcast and Net on the first Monday of each month under the callsigns VK3OTN and VK6OTN. Membership hovers around 430.

Sadly, one of our stalwart members recently became a Silent Key. Allan Doble VK3AMD had been Secretary, President, Broadcast Officer and Historian in his time and will be very sorely missed by the Club. He was also a regular contributor to *OTN*, a twice-yearly magazine of very high calibre prepared by Bill Roper VK3BR.

To mark the Club's 30th Birthday there will be an on-air QSO Party later in the year – this to allow time for publication in the next magazine.

Also, the Club will welcome in to membership any amateur who has been licensed for ten or more years – and there are quite a few of you out there!

Please contact the Secretary at PO Box 107, Mentone, 3194, or via email at raotc@raotc.org.au for information and help us say Happy Birthday RAOTC!

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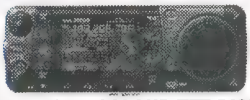
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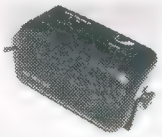
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Review of The Diamond X-200A antenna

Hayden Honeywood VK7HAY

The Diamond X-200 was featured in 1992 in an article in Amateur Radio Action. After having read this article and borrowing the antenna for a short time from another amateur (and having good results), I decided to lash out and buy one from Andrews Communications Systems at a cost of $149. The antenna is currently available from Dick Smith Electronics for $199.

The X-200 is a 2 m/70 cm Vertical antenna which is 2.5 m long. The X-200 is made of white fibreglass and is a two 5/8-wave on 2 m and a four 5/8-wave on 70 cm. The antenna is supplied with three ground-plane radials for a clean radiation pattern; however the antenna can be mounted without the radials for portable use. The antenna's gain is 6 dB on 2 m and 8 dB on 70 cm. The Diamond X-200A is one of seven similar models made by Diamond with the smallest being a X-30 at 1.3 m long and the longest a X-700H at 7.2 m long. Gain increases with size, with the X-30 at a gain figure of 3/5.5 dB and the X-700H with a gain of 9.3/13 dB. The X-200 is one of the most popular, and the third shortest. The X-200 is a great antenna for Field Day operation and also a good base station antenna.

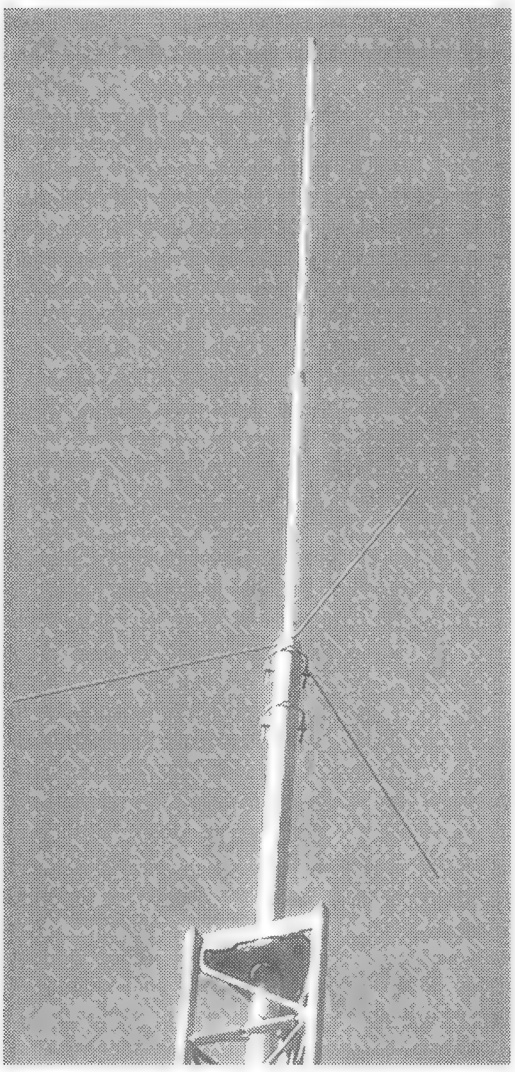

Photo 1 - The Diamond X-200A installed and ready to go.

Assembly

The antenna has arrived! I slipped off the postal packaging. The antenna was housed in a very good quality plastic bag, suitable for fishing rods. I checked the list of components to make sure that none were missing. Everything was OK.

Now to remove the antenna from packaging. Let's see where to start. So much sticky tape! Scissors should fix that. Okay, all free from the plastic.

Wow! The construction of the Diamond X-200 is absolutely wonderful. The white fibreglass is excellently made. The instructions say to connect the upper and lower elements together. Slide the set-screw clamp down the tube to where the bottom half of the element is - now attach the elements together. After fixing the element at the element joint bracket, connect the upper and lower outer shells with the outer shell joint bracket. Fasten the outer shell joint bracket with a wrench. Next attach the mast brackets to the support pipe. Then connect coaxial cable to the feed point (SO-239 type) through the support pipe. Just before inserting your PL-259 connector, remove the plastic inside the socket. By aligning the holes at the bottom of the antenna and upper part of the pipe, fasten the pipe with lock screw. Just before mounting the antenna, install the radials provided and put it up the mast. Total construction time was around 30 minutes.

Performance/Tests

I live in an area surrounded by hills and the only repeaters are at least 40 + km away. A recent move of one of the strongest repeaters to my location has put a downhill slide in my activity on VHF. Fortunately, another repeater I am able to access will be linked to the moved repeater.

I decided to mount the antenna on my tower at a height of 10 m. I ran 22 m of RG-213 coax to my station. This coax is a very good coaxial cable for medium runs (under 15 m) on UHF and on VHF for high runs (20-30 m). 15 m of RG-213 on 450 MHz is a 2.3 dB loss which is quite easy to live with. 30 m of RG-213 on 144 MHz is a 2.6 dB loss; this is quite good as well.

I ran the coax in and decided to do a test on the SWR. I couldn't measure the UHF SWR but, if the VHF is good, I can only assume the UHF is the same. The lowest point of SWR according to the charts is at 145 MHz where it is 1.1. It rises to 1:3:1 on 146.500. On UHF it is a different story. The lowest point is at 435 MHz with SWR at 1.1. This antenna may be used with UHF CB as well. I read a review on one of these antennas and found the SWR to be around 1.7 at UHF CB frequency.

The first repeater I chose to hit was

VK7RTC on Mt Nelson in Hobart. This is a fair signal into here and the only UHF repeater in southern VK7. The repeater came back with a signal strength of S3. I thought, that's strange, it should be stronger than that? I went back up the tower to make sure everything was in place. After talking to another amateur, who said it might be the wind blowing the mounting pipe near the antenna, I lowered it down to a level where it wasn't blowing about as much. The repeater signal jumped up to S6. Any increase in signal is good here!

The next target I chose was VK7RHT on Snug Tiers. This repeater is my main VHF repeater. The signal is normally S3 or 4. The repeater came back at S5. Another station said that it was the best readability he had ever heard me!! I tried another repeater on Mt Faulkner in Hobart. This is blocked by hills including Mt Wellington at a height of 1200 + metres. I got the repeater back at signal strength 1-2. Not the best, but I have another antenna for that repeater.

I then tried to work VK7RAD in Hobart on the Domain. This repeater is completely blocked from me but, with a mobile antenna, I can hear the repeater around an S2 about 2 km down the road. I was hoping the X-200A would pull the repeater out of the noise. It wasn't the case. I tried listening for it when the broadcast was on, and I could just hear it in the noise; however, readability was 0.

Simplex around the local area was outstanding. I was hearing stations I have never heard before. A mobile near Hobart on 2 m was an S2 and steady going through a valley of hills. Also, another station on 2 m was heard. He lives in New Norfolk which is a little town off to the west of me. A huge (500-600 m) hill is directly behind me. This station is located on the other side. The X-200A pulled him out of the noise with an S2 and nice audio.

All in all, the X-200A performed well in most areas. The X-200A is now my main VHF/UHF antenna installed on the top of the tower. My radio shack is just starting to be built and I will be able to reduce my coax line. I hope some increases in signal will happen after I reduce the coax losses by half.

VK7RAA on Mt.Barrow, which is over 160km from here, has been heard and worked about 3-4 times now at about S2. The X-200A was the only antenna that could deliver a signal out to it and no other antenna on site could work, or even hear, the repeater.

Instruction manual

The instruction manual is a single slip of paper with lots of clear diagrams and descriptions of the X-200A. When I first looked at the manual, I saw all the Japanese characters and thought to myself, "How am I going to follow just the diagrams"? However, I turned the slip of paper over and found a nice little section in English, with all the required details, including VSWR and the specifications chart needed to construct the antenna.

Conclusion

The Diamond X-200A is a very nice VHF/UHF base station/portable antenna. It does, though, have limitations when it comes to hilly terrain operating. However, if you can get one of these antennas out in the clear and high up, it may be the best antenna on site. For portable use it's also excellent.

It folds down to 1.5 m (if you want to disconnect the electrical connections inside) for travel or portable and is very useful for base station applications. People in non-mountainous cities, or in the country, should consider an X-200A carefully. If possible find someone in your area who has an antenna like this and try it out. You may be surprised. Many dealers advertising in this magazine deal with Diamond antennas.

My review of the antenna contains my personal views and results may vary depending on a number of factors (e.g. repeater location, conditions, etc).

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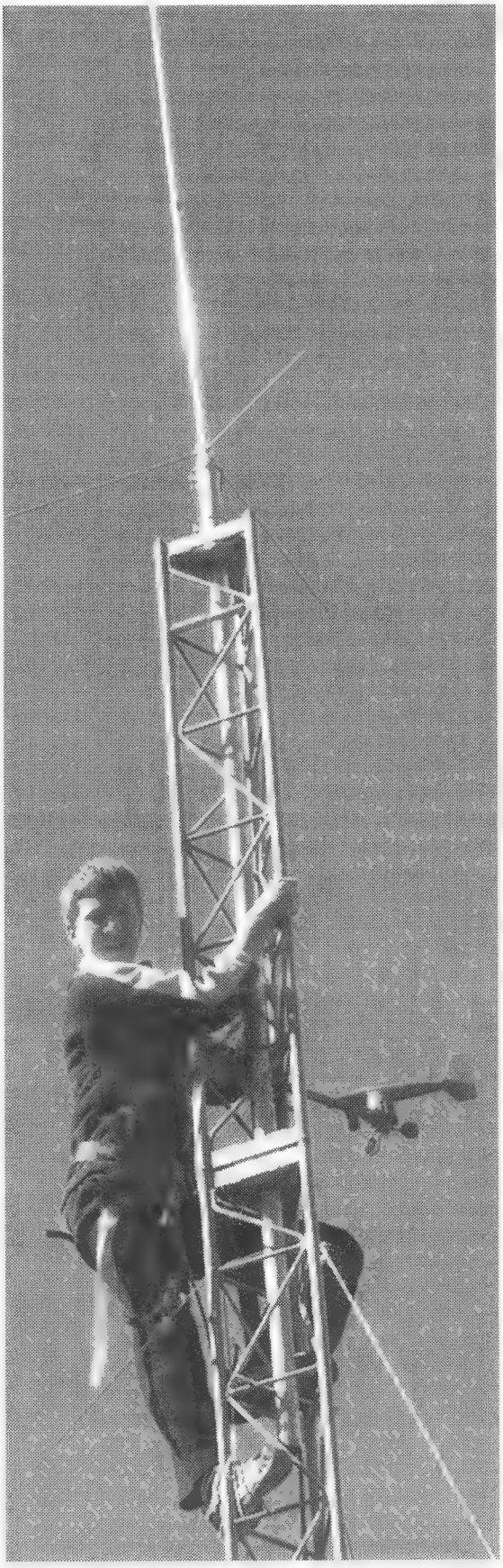

Photo 2 - Installing the antenna was a breeze.

Know your secondhand equipment

Ron Fisher VK3OM

SWR and power meters

Not the usual old equipment reviews this time, but a look at possibly the most common piece of test equipment found in the amateur radio shack, the SWR/power meter. The operation and interpretation of these instruments is not always understood, particularly by many new amateurs.

I have always thought that a good way to describe what we see with a typical meter is that a good SWR reading can mean two rather different things. First, you have a good SWR and second, you haven't. We will have a look at some common SWR/ power meters and discuss what they can and cannot be expected to do.

I will also give you some idea of what you should expect to pay for them on the secondhand market. I have decided to make this a pictorial article - with a description of each as we go.

Photo 1 shows a very common meter, often found for sale at hamfests. They come with other brand names but I think they all come out of the same factory. It is an SWR meter only and cannot measure actual power output. It is what is called a through line meter, which varies its forward sensitivity with frequency. The lower the frequency, the more power is required to give a full scale reading on the "power" meter and, in turn, an accurate SWR reading on the second meter.

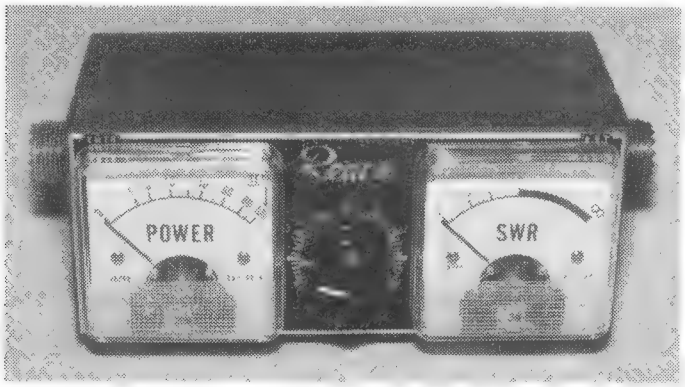

Photo 1

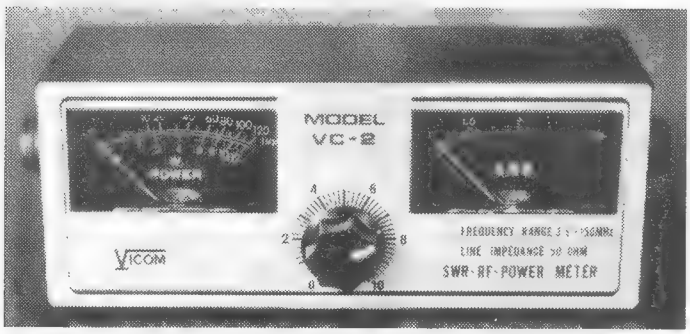

Photo 2

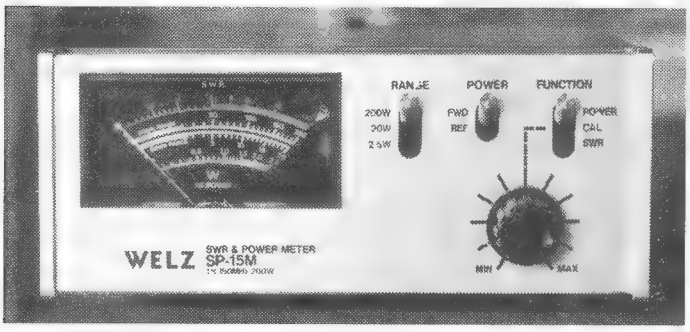

Photo 3

A transmitter output of 30 or 40 watts might be needed to get a meaningful reading. Obviously not good for a foundation licensee with a 10 watt maximum power limitation. Once you know all this, though, it can be a very useful adjunct to the shack. Having the twin meters is a big advantage over a single meter unit. These will even work with reasonable results on two metres.

So, what are they worth? I have seen them sell at hamfests for as little as $10, but perhaps be prepared to spend a little more.

Photo 2 is of a meter which is very similar in construction and application to the previous meter. It was originally sold by the VICOM company, early agents for ICOM equipment. All the limitations of meter No 1 also apply to this one.

One difference is that it was supplied with a chart to give an actual power reading. For instance, if the centre knob was set to 7.2 a full scale reading on the "power" meter would be equal to 120 watts. Unfortunately, the chart is often lost with secondhand examples. Don't expect this to be highly accurate but it's perhaps better than nothing. Also, this would only be for a steady carrier and not for a peak reading with SSB. More on this later.

These meters sell for up to around $30.

Most of the above also applies to the Osker Bloc SWR-200. Unfortunately, I don't have a photo of the Osker Bloc, but they are a very solidly built piece of gear and are often highly prized by their owners. They sell for up to $50. I believe they are over-rated and, in many cases, overpriced.

Photo 3 shows a Welz SP-15M which is in a different class from the previous meters. First, it uses a toroidal RF pick up system which means that it has a flat power sensitivity right across its frequency range. You don't have to set a critical control to measure RF power. Simply select the power range and there you are.

SWR is measured in the same way, though. Set full scale on the power range and then select SWR. However, even this meter has its limitations. It is very accurate with steady power but it is not designed to measure peak power

on SSB. We need to go a step further for this. A meter like this would sell for around $50.

Photo 4 shows a cross needle type which has become very common and popular over the last several years. As far as I can tell, Daiwa were the originators of the cross needle system but it has been copied by others, mainly MFJ.

The Daiwa CN630 pictured is actually for use on VHF and UHF bands but Daiwa produced identical models for HF use. Accuracy is excellent on the power ranges, but again it is not designed to read PEP power on SSB.

Opinion on cross needle meters is divided. I prefer a standard meter for easy reading of SWR but the choice is yours.

A meter of this type would sell for around $60.

Photo 5 shows another Daiwa cross needle variant. This one was designed for mobile use, but is still very useful in the shack. The same comments apply as for the previous Daiwa model.

Now we come to a different type of power meter. The next two will actually read PEP power for reasonably accurate measurements of SSB output. Again, you need to watch out.

There are two types of PEP meters, passive and active. The active meters include an electronic circuit which, in turn, usually requires a 12 volt DC power input. Some have a DC power supply built in and run from 240 volts AC.

Passive meters use a high value capacitor which the designers hope will charge up to the full peak voltage. Sometimes this will work but often it won't. Some passive meters will give a reasonable reading if the transmit audio is heavily processed which gives the capacitor more time to charge up. In other words, the active type is much more desirable. The following two are both of the active variety.

Photo 6 is of a Revex which came in several versions. Some were even sold under the Yaesu brand name. Major differences were in power ratings, with some having a 2 kW full scale, others with a 200 watt full scale.

Some had an illuminated meter face, some didn't. Overall they worked quite well with perhaps the only criticism being the rather small meter face. They all require an external 12 volts DC power supply. Depending on just what you want, they can be a good buy. Expect to pay around $70.

Now we are getting into the "Rolls Royce" class, the Kenwood SW200 (see photo 7) and SW-2000. These have large easy-to-read meter faces which are clearly illuminated. The PEP function is easy to follow and, when compared to professional power meters, they give very accurate indication.

The actual power sensors are external to the meter/control box so you don't have to bring heavy coax cables up to the operating position. And you can connect up to three sensor units to the one controller, perhaps one for HF, one for VHF and one for UHF. The difference between the SW-200 and the SW2000 is the maximum power rating. Both require a low current 12 volt DC supply.

The price? Well this depends on what you get. A control unit with three sensors might be worth up to $140. With one sensor, which is the way most come, perhaps $100. These meters are not all that common on the second-hand market and additional sensors are almost impossible to find. If you have an SW-200/2000, you tend to hang on to it.

I hope all of this might throw some light on what you can expect from the humble SWR meter. Of course, there are dozens of different types out there and I have only covered some of the more common examples that I either have, or have used, over the years.

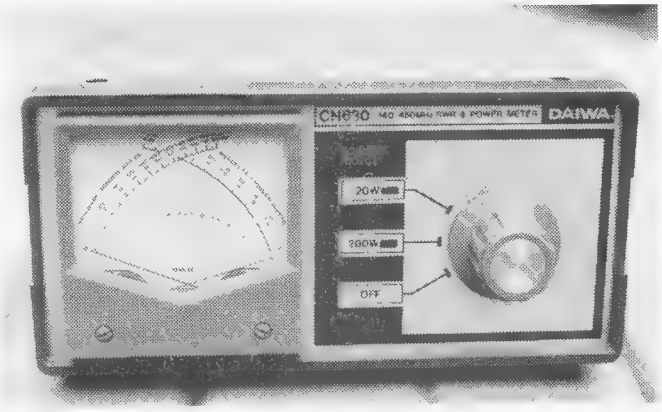

Photo 4

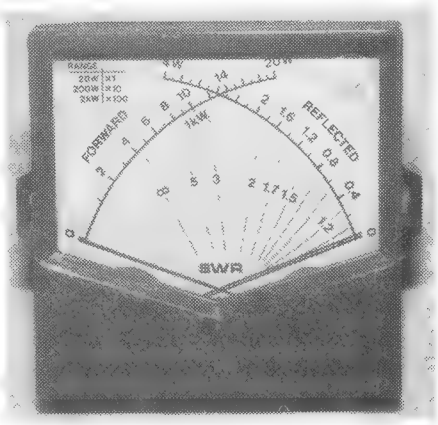

Photo 5

Photo 6

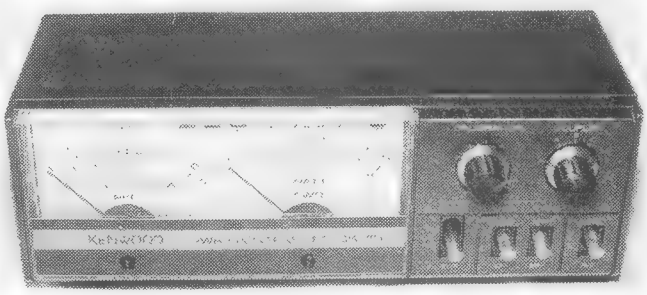
Photo 7

Technical abstracts

Peter Gibson VK3AZL

Voltage Conditioners for IC-703 and FT-817

Phil Salas AD5X has described a number of voltage conditioners for two commonly used portable transceivers in two recent magazines.

In *CQ* for June 2005, Phil described a simple voltage conditioner for the IC-703.

In fixed station operation, the power source is not changed often and is normally stable. However, portable and mobile operation requires a little more care in the choice of power supply. Also, it has been reported that some switching supplies put out high transient spikes when turned on.

The schematic of the power conditioning circuit is shown in Figure 1. The heart of the circuit is the 15 volt 600watt voltage transient-suppressor diode and the 5 amp Shottky diode. The transient-suppressor diode will take care of any voltage transients above 15 volts (and can sink up to 100 amps for 10 milliseconds), and the 5-amp Shottky

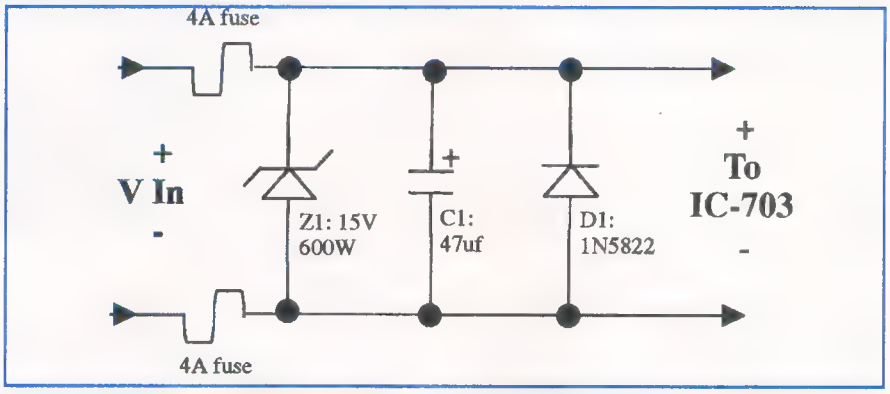

Figure 1 – Schematic of the IC-703 voltage conditioner circuit

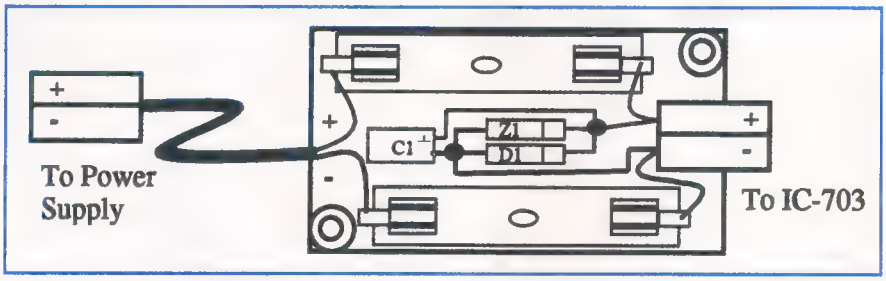

Figure 2 – Internal Component mounting

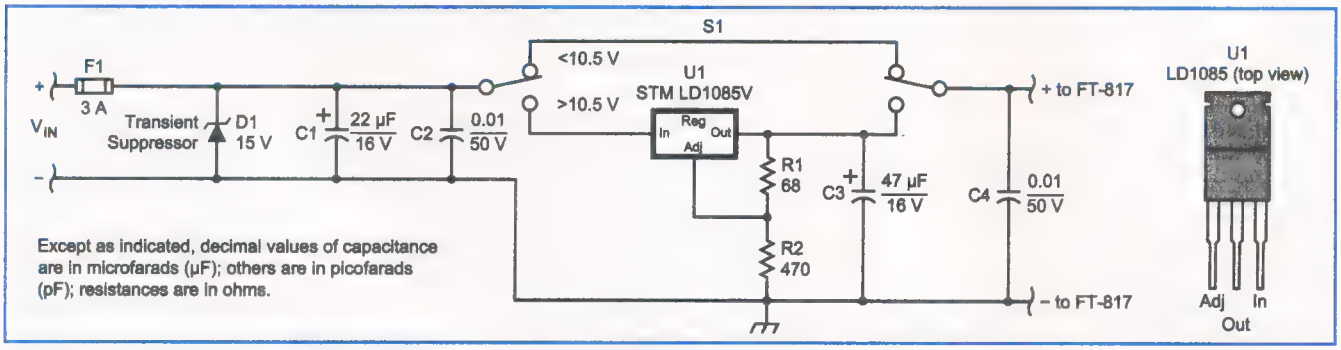

Figure 3 – Schematic of FT-817 voltage conditioner

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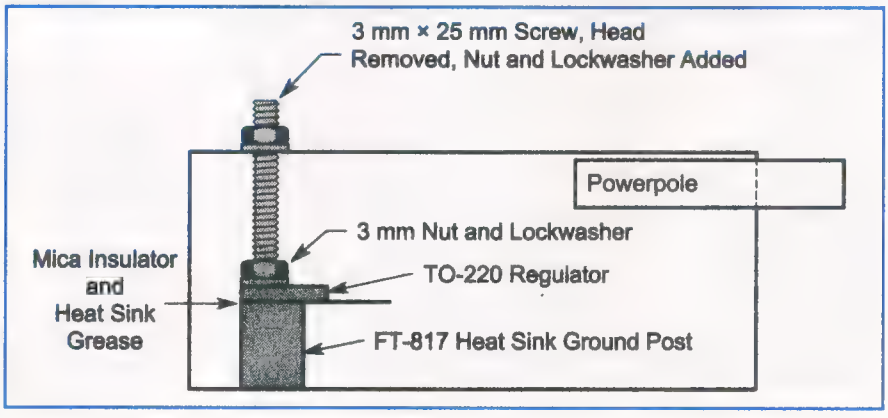


Figure 4 – A side view, showing the regulator mounting

diode provides reverse protection by blowing the fuse. Low frequency capacitive filtering is also included and 5x20mm fuses are used because of their small size and availability.

The circuit is housed in a small plastic box. The layout is shown in Figure 2.

In QST for June 2005, Phil describes a more sophisticated input voltage conditioner for the FT-817. In this case, the aim is not just to protect the radio against transients, but to control the input voltage to minimize power dissipation.

A characteristic of the FT-817 is that it draws the same amount of current across most of the useful voltage range for a given power output. That is, at 5W power output, the FT-817 typically draws 1.9A, whether the supply voltage is 9.6V or 13.8V. Therefore at the higher voltage, you are dissipating up to 8W more power inside the radio.

Therefore, the conditioner not only provides reverse power and transient protection along with inline fuses, but limits the voltage provided to the FT-817 to about 9.6V.

Figure 3 shows the complete circuit of the power conditioning circuit. The heart of this circuit is the STM LD1085V low voltage drop-out adjustable voltage regulator. It is packaged in a TO-220 case and is rated at 3 Amp output. At full rated output, only 1.2V is needed across the regulator. The output voltage is set by the two resistors, R1 and R2. In this case, the values chosen give 9.6V output. For both transient and reverse voltage protection, a 15V/600W transient suppressor diode is used. Due to room considerations, the inline fuse is a miniature unit, soldered in place. In addition, a bypass switch is included to allow external voltage sources less than 10.5V to be used or the higher voltages that are needed for charging the internal batteries.

Completed unit mounted on rear of FT-817

The unit is packaged into a small plastic box to fit on the back of the radio. The wiring is point to point and the regulator IC is attached to the ground post on the rear heatsink. Figure 4 shows part of the internal layout of the box. The photograph shows a picture of how the unit is mounted on the rear of the FT-817.

ar

Silent keys

Clifton John Arnold VK3AJA

20-7-1915—11-10-2005

It is with regret that we advise East Gippsland amateurs and his many on-air friends that Clif has become a silent key. Clif was first licensed in 1947 and operated from his home in Stratford where he had lived since 1922.

Clif was born in Ulverstone Tasmania, but the family moved to Stratford as Clif was beginning his schooling. Clif's schooling at the local Stratford school was cut short because of the depression years and he joined the workforce at an early age, digging sugar beet for the sugar mill at Maffra.

Clif had a distinguished war record. He joined the signal corps at Williamstown before the war, and became interested in Morse code and ham radio. He spent six years in the army, logging 776 days of active duty in New Guinea from 1941 to 1944. Most of the active service was with heavy anti-aircraft artillery battery. Service records indicate that he received a promotion, which he declined, electing to take a demotion and return to active war service as a gunner, rather than remain as an instructor. He was twice mentioned in dispatches.

Photography was one of his passions, having left the family a wonderful legacy of childhood photos. He was a member of the Bairnsdale Field Naturalists for many years and the Stratford Historical Society was another involvement.

Radio played a big part in his life, mainly operating CW, even up to the last month of his life. Sympathy is extended to his family of nieces and nephews.

Bob Neal. VK3ZAN.
Secretary EGARC

Alan McCaskill VK4SKL

It is with deep regret that I have to advise you of the passing of Alan McCaskill VK4SKL early on Monday morning 27th February after a short illness.

His voice may be silenced, but his memory will live on in the hearts and minds of those who knew him. It is always sad when we lose a member of our special "community" of amateur radio operators. He recently befriended a newly licensed Foundation level operator in the town where he resided and was helping him to increase his knowledge of the hobby to upgrade at the time of his death.

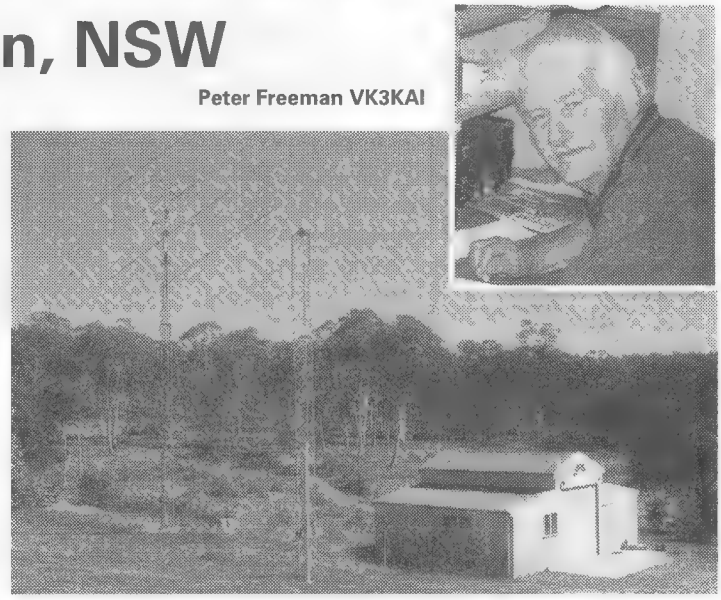
VALE Alan.

Ed Roach VK3BG

The man and his shack ~

Guy, VK2KU, Marulan, NSW

Peter Freeman VK3KAI

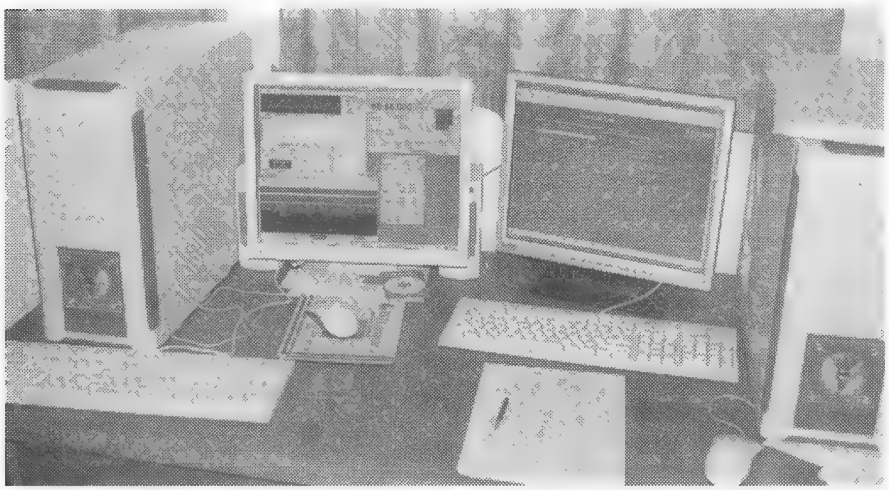


Guy Fletcher, VK2KU, was previously located at Hazelbrook in the Blue Mountains, where he was a very well known station on VHF & UHF. He was a regular on the Aircraft Enhancement morning activities. Like many of the weak signal operators in the Sydney region, he regularly appeared in the logbooks of ZL stations when tropospheric conditions arose. He was also active on 2 m Earth-Moon-Earth (EME), but these activities were constrained somewhat by the location and neighbourly considerations. Guy built up a very high score on the Grid Square Standings table, which he instituted and maintains to this day.

He moved to the Southern Tablelands in April 2004, to find an RF-quiet location with no neighbours (the nearest is 1.5 km away), and no significant council problems. This location was chosen with EME activities in mind and is excellent for this purpose and also gives a realistic possibility of applying for a high-power permit. It has a less than ideal outlook in all directions, but still is a reasonable site for tropospheric weak signal communications.

The radio shack occupies a separate room in one-third of a large shed. It is purpose-built, air-conditioned, and has lots of power points. One end of the shack is set up for electronics work, the other for operating. Any metalwork is done in the main part of the shed.

In early February 2005, a severe thunderstorm moved through the Marulan area. Guy suffered a near miss – a strike "landed" an estimated 150 m from the house and shack, causing much consternation and damaging many items of electrical equipment, including gear in the shack – a "near total wipe-out" in Guy's own words. Guy took the opportunity to rethink his approach to VHF. He wanted a better receiver than the now-dead FT-736R. The outcome was to use transverters, though this has only happened on 144 MHz at present. All coax, rotator cables, preamp and relay cables etc now terminate at an aluminium patch panel in the window, and are ALL disconnected when not in use. All earths from towers, shack and AC mains are bonded.

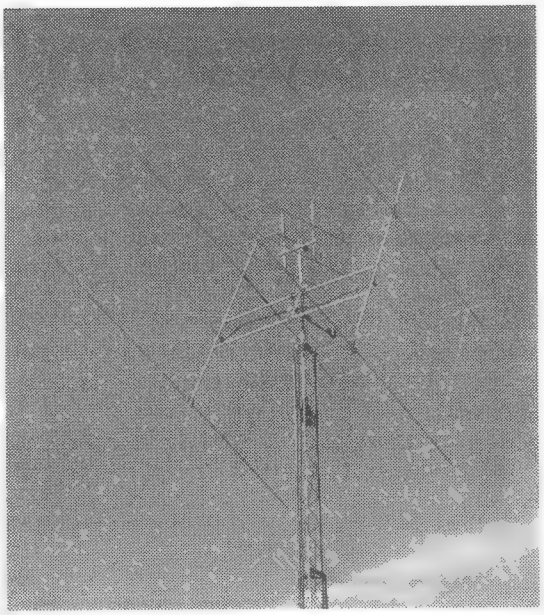


On 2 m EME, Guy uses a 4-bay array of 12 element Yagis of his own design, horizontally polarised on 6 m booms at 12 m, with elevation to 50 degrees. A Yaesu FT1000 MP Mk5 drives an Elecraft XV144 transverter (chosen because of its flexibility in configuration using jumpers, low drive requirement on tx, low noise factor on rx, and OCXO option on 116MHz crystal). In turn, this drives an aging home built amplifier with 2 x 4CX250B tetrodes, which runs at the legal power limit. On receive, RFham preamps (NF 0.25dB) are planned on 144, 432 and 1296, but only 144 is running at present.

As you can see in the photographs, Guy typically uses 2 computers when running EME with JT65 mode. One computer running the WSJT software under Win98SE and locked to GPS time, another connected for internet access, other programs, and a second WSJT receive channel.

The shack contains the following major instruments: HP Spectrum Analyser, VHF Sig Gen (R&S SMS), HP 275 MHz CRO.

Guy lists his major pending radio construction projects as:



- new g1 and g2 supplies for the linear (half finished for the last 5 years),
- a new linear with more grunt in anticipation of being allowed to run QRO, or at least able to loaf along at present power limits,
- bigger antennas for EME, possibly both V and H (see empty tower)
- GPS locked 10 MHz frequency reference

Guy's major interest is working EME on 144 MHz, both CW and JT65. As at March 2006, he has worked roughly 260 initials and over 200 grid squares on 2 m EME.

See inside back cover for colour pictures

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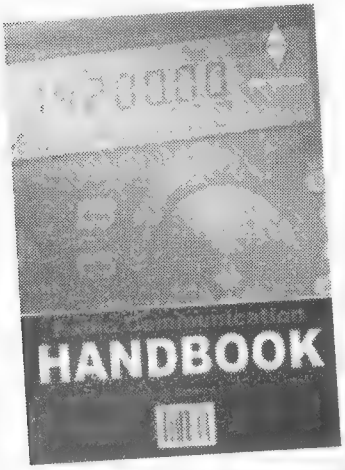

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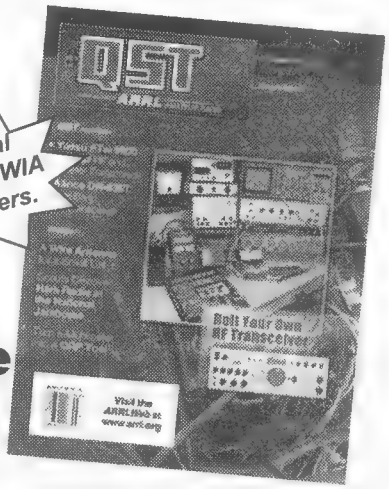

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Broadband Powerline Communications: Where are we now?

WIA EMC Group

Broadband over Power Line communications, BPL, (aka Power Line Communications – PLC, or Power Line telecommunications -PLT), is a method of injecting and carrying high speed data over the electricity distribution network, or the transmission grid. BPL promises a broadband signal at every power connection, without the need for additional cabling.

Communications over power lines is not new; it has been used for communications and network control functions for many years. Recent availability of low cost semiconductor chipsets, together with increasing community demand for broadband services and improved access, especially in fringe and regional areas, has encouraged development of BPL technologies to meet perceived consumer needs.

Two basic types of BPL have emerged:

"In-House BPL" carries in-house data within a building typically using "Home Plug" standard modems at each access point. In-House BPL competes with Wi-Fi and conventional wired networks.

"Access BPL" provides broadband access into a building for services such as internet, VOIP telephone services, entertainment, gaming, video, remote meter reading, and other services typically provided by a service provider. The broadband signal is coupled (inductive or capacitive coupling) into the mains distribution wiring typically up to a hundred meters from the customer.

Access BPL may be carried on the local low voltage or medium voltage (LV or MV) distribution network or on the high voltage (HV) transmission network. Often, injection points are located at the medium voltage to low voltage transformer, and a series of repeaters used to increase the range from each injection point to the customer premises.

BPL systems inject multiple carriers on to the power line about every 1 kHz over a very broad frequency range (many MHz bandwidth segmented over the range 3-80 MHz). Each carrier is modulated by the broadband data. Data speeds of around 200 Mb/s are claimed achievable with the second generation (DS2) chipset. First generation chipsets achieve 45 Mb/s. However, due to the 'branch and twig architecture' and inherent difficulties of using a largely unsuitable transmission medium, this speed is greatly reduced in real world networks, with 10 Mb/s probably being more a realistic maximum data rate achievable at the customer's premises.

Trials of BPL technology are occurring worldwide. Currently there are 23 active trials in the United States (1) and 7 in Australia (2).

In NSW Country Energy (3) has trialled 45 Mb/s technology and in Tasmania Aurora Energy (4) and its telecommunications subsidiary Tastel (5) has the first Australian commercial trial, using 200 Mb/s technology.

The Pros and Cons

At first glance a broadband power line delivery system appears socially beneficial. The last hundred metre connection into customer premises is often the most expensive element in any service delivery. By 'illuminating' the power network, BPL proponents claim to be able to provide quality broadband services quickly and economically, especially in areas not currently well served, (city fringe and regional towns). Further, utilities can lever off existing infrastructure and 'bundle' broadband and telecommunications services along with electricity and gas.

Command and control of the power network, automatic load shedding, dynamic pricing, and remote meter reading are increasingly seen as important applications for BPL technologies, especially as energy costs increase and nations attempt to reduce carbon emissions.

However, many believe the potential social benefits of BPL are outweighed by external costs. Power lines were never designed to carry the high frequency signals used by BPL, and they certainly don't do it very well, being full of discontinuities and connected to notorious sources of electromagnetic noise. In fact they do it so badly that significant energy must be coupled into the line in order to achieve any useful transmission distance, causing high unnecessary and unintentional emissions across the entire spectrum occupied by BPL system carriers.

The interference potential from BPL to HF radio communications users is continuous, broadband, uniform across the frequency band used by the BPL system, very high level, and geographically widespread. The entire mains distribution system within the service area radiates the BPL signal, and the signal is always on regardless of traffic levels.

The potential for interference to a diverse range of radio communications users is very high, including FM broadcasting and television.

The UK regulator OFCOM performed measurements at Crieff UK, including interference regression with distance.

Below 30 MHz the magnetic field regression, measured at 10, 30, 100 and 300 metres from the overhead line, was approximately 27 dB/decade and the electric field regression, over the same path, varied between approximately 16 and 21 dB/decade.

Above 30 MHz the electric field regression, measured at 10; 30; 100; 300; 1000 and 3000 metres from the overhead line, varied between 10 and 20 dB/decade. (6, 7)

Interference from BPL systems exceeds the background noise levels at considerable distances from the BPL enabled area.

International regulations

The International Telecommunications Union (ITU) (8) is the world body for the coordination and regulation of telecommunications. The Constitution of the International Telecommunications Union is the basic instrument of the Union and, together with the Convention and the Radio Regulations, forms a binding treaty to which Australia is party.

Article 15.12 of the ITU Radio Regulations provides as follows:

15.12 Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, including power and telecommunication distribution networks, but excluding equipment used for industrial, scientific and medical applications, does not cause harmful interference to a radiocommunication service and, in particular, to a radionavigation or any other safety service operating in accordance with the provisions of these Regulations. (Note that Article 15.13 imposes a similar requirement with respect to ISM equipment.)

The amateur service is a radiocommunications service as defined in the treaty.

The Radiocommunications Act, 1992, is the Australian instrument which gives effect to the ITU agreements. Section 197 of the Act prohibits a person from knowingly or recklessly causing interference to radiocommunications (9).

The ACMA position

The Australian Communications and Media Authority (ACMA) (10), formerly the Australian Communications Authority, (the ACA) is charged with administering the various instruments relating to radiocommunications, telecommunications, broadcasting, and electromagnetic compatibility and susceptibility, in Australia.

The (then) acting ACA Chair commented: *the challenge for the ACA is to set regulatory arrangements that do not unnecessarily inhibit the adoption of BPL technology but at the same time protect radiocommunications services from harmful interference.*

The ACA published BPL trial guidelines (11) through a web information portal in order to assist with minimising the potential impact of BPL trials. In April 2005, ACMA released a BPL Discussion Paper (12) which attracted 275 responses (13) from a wide range of organisations.

The majority of the submissions show a high level of concern regarding BPL interference and its management. The lion's share of the submissions--222 in all--came from radio amateurs, including a significant submission (14) from the amateur radio peak body, the Wireless Institute of Australia (WIA).

Others were from telecommunications companies, broadcasters and government agencies. One commenter, telecoms provider Optus, recommended a "cautious approach" and expressed concern over potential BPL interference to its cable services as well as over the issue of regulatory and competition certainty. Broadband cable and DSL provider Telstra worried about interference to its broadband and HF radio services saying its calculations indicate *ubiquitous BPL could have serious consequences for cable modem networks* and could lead to *significant degradation of VDSL in cases where power and telecommunications lines are in close proximity*. Commenting through their industry association--the Personal Emergency Response Services Association (PERSA), medical alarm providers concluded that electromagnetic interference from BPL to PERS is potentially severe, continuous and widespread. *BPL interference could prevent a call for assistance in a life-threatening situation, resulting in death or injury*, PERSA asserted. Not surprisingly, submissions from the BPL industry recommend less onerous management techniques.

ACMA have indicated they will review the BPL trial guidelines in response to submissions received, have consulted stakeholders, and embarked on a comprehensive examination of the communications regulatory issues.

Clearly ACMA are taking a light handed approach to BPL, not wanting to prevent a potentially beneficial technology from being trialled and further developed, while on the other hand attempting to administer their responsibility under the Radiocommunications Act to licensed radio communications users.

Some suggest ACMA is taking a more economic rationalist position than in the past and, in the absence of conclusive evidence of the economic viability of Access BPL, believe there is no need for immediate regulatory action - i.e. the problem may simply go away.

The extent of the interference problem

The ACMA measured unintentionally radiated interference emission levels at BPL trials in Queanbeyan and Moruya NSW. Their report "Queanbeyan BPL Trial Measurement February 2005" (15) compares measured emission levels with the US FCC part 15 standards. All of the emissions were above the Part 15.209 maximum, and the range was 9

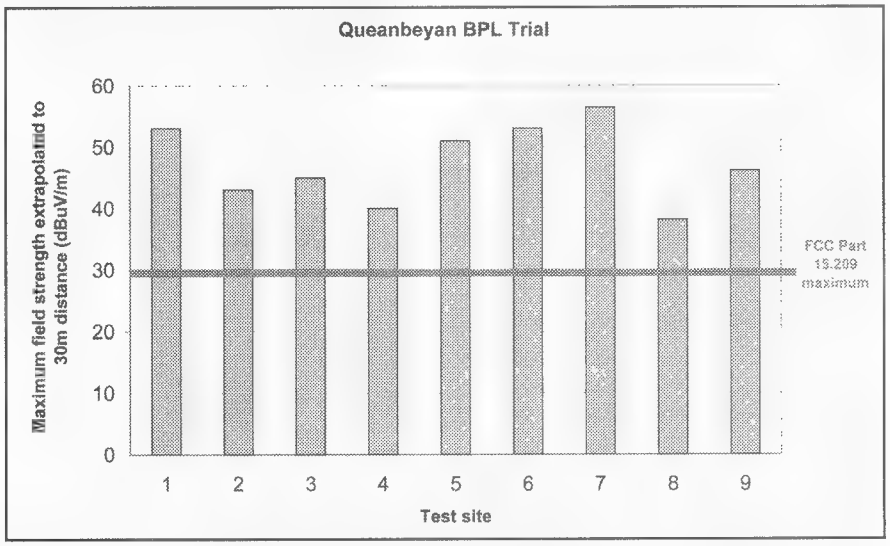

Figure 1. Queanbeyan BPL Trial emissions compared to FCC Part 15.209.

dB to 27 dB in excess, the average of 9 sites is 18 dB in excess of the Part 15.209 maximum.

Telecommunications and IT consultant Owen Duffy, (VK1OD), published the measurement data of the Queanbeyan trial in graphical form, on his website (16). The chart, which is Duffy's presentation of the ACA's measurements documented in their published report, is reproduced in Figure 1.

Duffy draws the conclusion, *An amateur radio station located in a residential environment where a similar BPL system was deployed would not be safely able to transmit at all on the 7 MHz, 14 MHz, and 21 MHz bands because of the high risk of interference to possibly active stations that would not be heard through the BPL interference, effectively curtailing all activity on the band by such a station.*

To date, traceable interference measurements have not been published for the Aurora Energy trials in Tasmania using the new 200 Mb/s technology. Aurora is continuing to make changes to the technology, and ACMA have indicated that they will not take measurements themselves while changes are likely to be made (naturally, the results could easily be discounted).

Radio amateurs have made measurements at the Aurora Energy trial using a new technique for measuring field strength developed by Duffy and Hare. FSM (for Field Strength Meter) (17) is a software application that extends a conventional SSB receiver to allow measurement and calculation of field strength of radio signals or interference.

FSM measurement data and observations by amateur radio operators suggest that the interference levels from the new technology Aurora Energy trial are also high, though possibly not as high as earlier 45 Mb/s technology trials such as Queanbeyan (18).

One local Hobart radio amateur has filed an interference complaint with both Aurora Energy and ACMA.

Aurora claimed to have achieved a "90% reduction" in emissions after making modifications to the coupling method. Although a "90% reduction" might sound a lot to a lay person, it amounts to only a 10 dB power reduction

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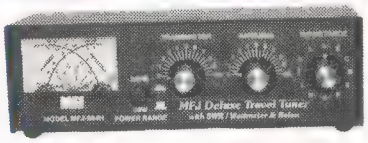

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and falls far short of what is required to ensure that interference is not caused to radiocommunications services.

The American Radio Relay League (ARRL) (19) is the peak body representing 700,000 United States radio amateurs. The ARRL states: *Many, if not all, of the BPL designs that have been deployed to date suffer from a number of technological weaknesses. Perhaps the most critical of these is that BPL is seriously degraded by nearby transmissions from low-powered transmitters from sources like Amateur Radio or CB. In several BPL cities in the US, amateurs have done experimentation that shows that as little as 5 watts of power from a nearby radio transmitter can seriously degrade the performance of BPL. In some cases, the interference logged off a BPL user, requiring a reconnection to the network* (20).

Motorola released a new BPL delivery method (21) which it claims greatly reduces the potential interference to (and from) amateur radio stations. Named "Powerline LV," it only uses the local low voltage LV line from the transformer to the home to deliver the BPL signal, using a "Home plug" type format. Motorola have also included proper RF level filtering for amateur radio frequencies at both the transformer injection point and the in-home modem. Unlike other access BPL technologies, the Motorola system only carries data when actually in use.

However, if the Motorola BPL system was used in Australia, unacceptably high levels of interference to HF users might still occur due to the greater length of line from the MV-LV transformer to the customer premises in our 240 V system, and the likely necessity for higher injected power

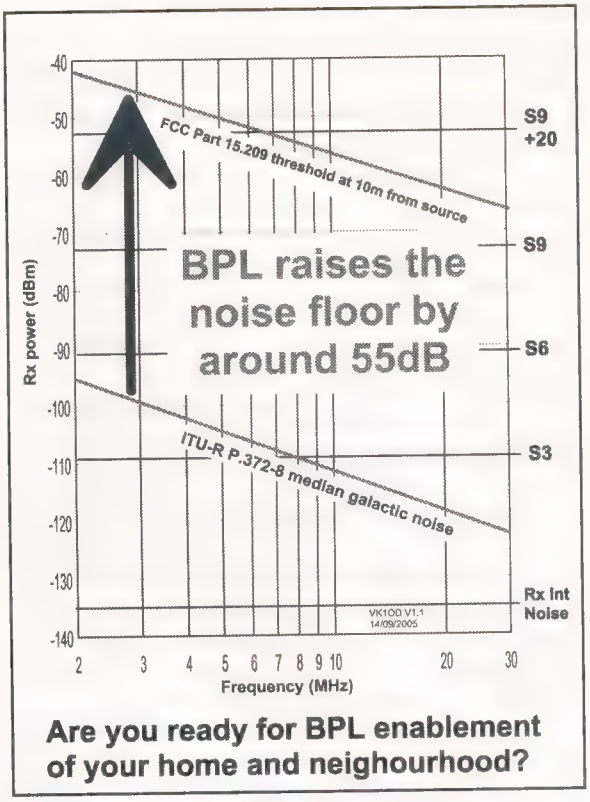

Figure 2

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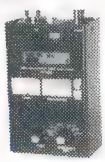

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to enable the BPL signal to span that greater distance. However, the Motorola system appears to be a step in the right direction.

The effect on radio amateurs

Amateur radio operators are particularly adversely affected by any interference, because they very often carry on communications using weak signals that are just above the local spectrum noise floor (RF noise background). Hence, signal-to-noise ratios are low – often considerably lower than those normally expected by other services. However, in sparsely settled rural areas, commercial and emergency service users are likely to also need to establish communications at similarly low signal to noise ratios.

Most amateur radio stations are located in suburban areas, where the spectrum noise floor encountered is generally tolerable for the majority of amateur radio activities. A proportion of radio amateurs are located in rural regions, where the spectrum noise floor is comparatively low, which permits operating with lower signal levels.

Amateur radio stations use antenna systems that are typically located within a suburban backyard and are not far from mains power lines. Even in rural areas, radio amateurs locate their antennas close to houses, not far from power lines.

The graph (Figure 2) by Duffy highlights the harmful effect of BPL operation at the FCC part 15 levels on HF radiocommunications. Australian BPL trials measured to date exceed FCC Part 15 levels (22).

The graph shows the expected receiver input power from the natural noise floor (galactic noise (from ITU-R P.372-8)); and the expected receiver input power from BPL that is of intensity sufficient to result in a maximum field strength of 30 µV/m at 30 m distance as specified by FCC Part 15.209. Duffy documents the assumptions underlying the model, and compares the model with measurements by Australia's communications regulator (ACA/ACMA) of an Australian BPL Trial of DS2 BPL. The graph's receiver power axis is scaled in both dBm and in "S-units".

Notes:

The upper noise line is the noise at 10 m from a radiator that is of intensity sufficient to result in a field strength of 30 µV/m at 30 m distance as specified by FCC Part 15.209. The interpolation uses the factor specified in 15.31(f)(2), and is done to reflect the realistic distance of an amateur receiving antenna from BPL excited power lines or power wiring. The assumption is that BPL operators will operate the system at the highest permitted power level to obtain the best speed/distance performance.

Many of the BPL systems trialled and measured in Australia and elsewhere have had emissions in excess of the FCC Part 15.209 specified limits (see below).

The lower noise line is the galactic noise level predicted by ITU-R P.372-8 formula. Galactic noise is the dominant source of noise above about 4 MHz in quiet locations, and is unavoidable. At lower frequencies, galactic noise may fall off, but man-made noise of similar intensity replaces galactic noise.

All predictions are for a receiver noise power bandwidth (NPB) of 2 kHz. (Nominal 3 kHz SSB voice receivers often have an NPB closer to 2 kHz.)

Rx Int Noise is for a typical modern HF transceiver, older equipment might be up to 10 dB to 15 dB higher.

S values on the right axis are S-meter readings based on S9=50 µV in 50 Ω (-73dBm) and 6 dB/S-unit.

BPL Standards development

Standards development is largely a consensus driven process, and lack of progress towards the development of any meaningful international standard for BPL is a direct result of the huge gulf (some 50-60 dB) between the unintentional emission levels that radio communications users can live with, and what BPL providers can make work. There seems little chance of arriving at any form of consensus anytime soon.

A good overview of the development of a BPL standard is at: http://www.iee.org/OnComms/PN/emc/Broadband%20RF%20Emission%20From%20Data%20Networks.pdf

The BPL Industry response to radio amateurs interference claims

Stakeholders in this battle strongly defend their positions. Radio amateurs proclaim BPL providers are reckless spectrum polluters akin to technological carpetbaggers, and BPL providers view radio amateurs as technological Luddites who would deny broadband to the masses rather than give up their quaint hobby. *We can not have people 'back in the days of pulse dialling systems' lobbying against technology that will bring this country into the 21st century!*

In the face of mounting evidence of BPL generated interference, The PLC Forum (23) proclaims, *Even if the promoters of competing alternative infrastructures may be disappointed... there are still no cases of proven harmful interference despite tens of thousands of users, hundred of thousands of connected properties, and a number of independent and comprehensive measurement campaigns! Moreover, would any local EMC (electromagnetic compatibility) troubles appear, current features of PLC technologies enable the removing of emission frequencies to avoid such troubles.*

BPL proponents continue to deny the harmful effects of BPL interference in the face of enormous evidence worldwide to the contrary. Denying the existence of harmful interference has been the 'modus operandi'. In the beginning, there was no interference, then there

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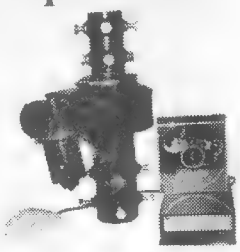

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was some interference, and now it has become "who needs HAM radio?"

Ed Hare is the technical manager for the ARRL. Hare puts it this way:

Assume you are a PSK-31 (slow digital mode) operator who has a 10-minute 'brag tape'. 'When you get on the air, a harmonic from your station blanks out your neighbor's TV. He complains. You switch to Morse CW, which "reduces" the interference to a steady on/off blinking. Will your neighbor think that the interference is improved?

He complains some more, so you "notch" his spectrum by 20 dB. This "reduces" the interference from complete blanking to a strong herringbone. He can hear the sound now, but the picture blinks on and off with a herringbone under which one can just make out the picture.

You then tell him that you have done all that you are going to do, but if he has interference on another channel, you will be willing to consider fixing it. You then tell all of your neighbors that you have fixed his problem, but that he is pretending that you didn't and his complaints are not valid.

He knows all this, and, having seen you lie, he knows that if he indicates in any way that the interference isn't quite as bad as it was, he can expect that you will tell all your neighbors that you admitted that he fixed it. And you know that if you do recognize this non-fix as the least bit improved, you will lessen the chances that anyone will require him to fix the remaining, serious interference.

This is exactly what the City of Manassas (in the US) and COMTek (a US BPL provider) are doing. Any incremental improvements have not dropped the interference below the level of serious, ongoing, widespread harmful interference. Instead of S9+30 dB, it's now "only" S9. That is not a change in the interference status.

Is HF radio dead?

Another pro-BPL argument is that HF radio is mostly dead, and any services that still exist could be moved off HF onto satellite or the internet. However, HF radio is enjoying somewhat of a resurgence. New digital streaming techniques for HF broadcasting, such as Digital Radio Mondiale (DRM) (24) can mostly overcome HF's disadvantages including annoying fading and noise, and also provide improved sound quality.

Cyclone Katrina (25) and the tsunami in Asia (26) proved beyond doubt the benefit of HF radio, being a simple, easy to deploy, long range communication system which does not rely on any infrastructure. In fact, amateur radio operators are routinely first on the scene at disasters providing critical first line communications until government and emergency communications systems are activated (27).

Australia relies heavily on HF radio. The ACMA licence register identifies 33,000 licensed HF radio users. Military, civilian, aviation, and emergency communications systems rely heavily on HF radio. HF radio is a valuable backup system to other long range communications systems used by many agencies including the Department of Defence.

Clearly, the success or otherwise of BPL depends largely on its economic viability and its ability to attract customers in the face of stiff competition from other broadband technologies. Experience in the US is mixed with some trials claiming success and others terminating for various reasons, including poor economic viability and competition from other technologies.

Many believe if BPL is to find a place it is likely to be in city fringe or regional towns which are not well served by other broadband technologies. Even in these areas, given recent initiatives by Telstra to speed their rollout of broadband optical fibre, the window of opportunity for BPL may find its major application in niche markets such as security, industrial, or in-building applications.

Radio amateurs are not opposed to any technology which will improve access and competitiveness of any service, BPL included. Radio amateurs are strongly opposed to any technology that causes such very high levels of electromagnetic interference they can no longer enjoy their hobby.

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ar

ALARA

Christine Taylor VK5CTY

New Foundation Licences

Almost every time we listen to our radios these days we hear about a new licensee, and quite a number of them are YLs. Our members have been keen to include these new YLs into the ALARA world, I am pleased to say.

We welcome them all and hope they will get as much pleasure from the ALARA friends they make as we, longer time members do.

We are particularly glad that Mandy, VK4FRST, the first YL F class licensee, joined up almost immediately and we look forward to welcoming Norma's daughters, Lorraine VK2FICQ, Michelle VK2FMYL and Christine VK2FIZI, because of the link with our earliest years.

I was pleased to get an email from Brenda VK3KT, telling me that, now that her granddaughters have their Foundation licences, there are three generations of YL licensees in her family (as she also has two sons and two grandsons with licences she can also boast three generations of OM licensees but that news belongs elsewhere in this magazine).

Brenda was Education Officer for the WIA for many years and is well known to readers of AR in that role. The whole story will appear later.

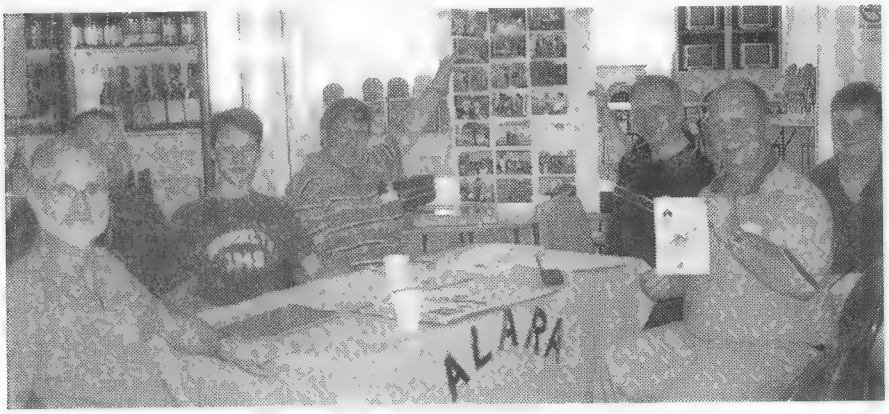
Congratulations to Brenda and family.

The Gosford Field Day

As usual Dot VK2DB was at Gosford to wave the flag for ALARA, but this year she has provided us with a different sort of photograph of the occasion. The callsigns around the table are, from left to right, Tony VK2TJF, Steve VK2HIP, Roger VK2FOTO, John VK2ZOI, Greg VK2TEQ, Peter VE2ZPT and Mark VK2FRST.

The other, more normal photo shows Beryl VK2BBM and her OM Doug VK2YI manning the table (Dot cut herself and her OM, John out of this picture to make a change).

Many people, OMs and YLs stop to chat and look at the material on show which keeps ALARA in the public eye.



The ALARA/YL nets

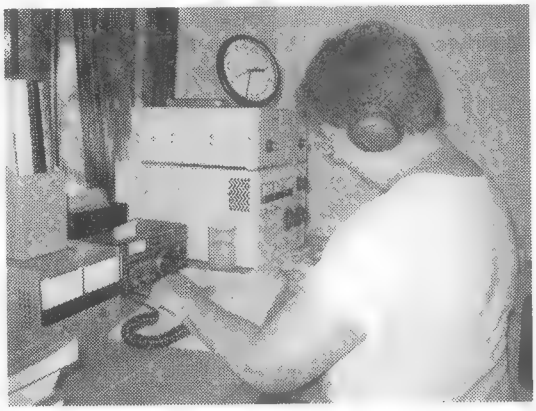
ALARA has a regular net every Monday evening on 80 metres. All YLs are welcome to participate. If you do not have a licence or a callsign, your OM can call in for you and then pass the microphone to you. We will welcome you and as we each take our turn to speak we will probably tell you where we live and perhaps a little about ourselves so you feel you know a bit about us.

There is a Net Controller who calls everyone in and lists the participants in the order they are are heard. Then we pass the microphone on to the next one in the list when we finish our over.

The Net Controller sorts it out, so if we are not sure who to pass the mike to we can pass it back to her. The whole thing is very friendly and easy. Please join us sometime.

The net starts at 1000 Zulu in the summer and 1030 Zulu in the winter and is run on or near 3.580 MHz. The change of time allows us all to get to bed at a reasonable time, regardless of where we live or whether our state has daylight saving or not!

The photo shows Shirley VK5JSH, a regular on a Monday, a picture of concentration; but most of us are also knitting or sewing while we talk (and make notes of what others have had to say (as Shirley is doing) so we can respond when our turn comes around.



David A. Pilley VK2AYD

USA nostalgia

The ever changing world

The telegram has become a relic of a by-gone past and it looks as if the Morse code may not be too far behind. A message from Western Union said *Effective January 27, 2006, Western Union will discontinue all Telegram and Commercial Messaging services.* The world's first telegram was sent on May 24, 1844 by inventor Samuel F.B. Morse. The message, "What hath God wrought," was transmitted from Washington to Baltimore in the USA. According to an article by "LifeSciences.com", Western Union goes back to 1851 as the Mississippi Valley Printing Telegraph Company. In 1856 it became the Western Union Telegraph Company after acquisition of competing telegraph systems. By 1861, during the Civil War, it had created a coast-to-coast network of lines. With telephone calls being so cheap and internet international, the need for telegrams no longer exists. Ah, those were the days!

DX Most Wanted

Geography knowledge

Reading the *DX Magazine* Most Wanted list I was surprised at my lack of geographic knowledge after 65 years of AR. The most wanted DX country is Scarborough Island (BS7H) followed by Lakshadweep (VU7). Other places mentioned were Navassa (KP1), Desecheo (KP5), Glorioso (FR/G) and Andaman & Nicobar Island (VU4). It's worth testing your knowledge to find these – or ask the children!

UK: GB2RS digital news

The RSGB news service is going digital

(Last month I wrote about my experiences with digital voice on HF, now I read the RSGB is already using it – I'm learnin')

Last December RSGB advised readers and listeners some experimental GB2RS news broadcasts were planned for 2006 using digital voice transmissions. The first of these experiments took place from GX0BAA on Sunday 12th February at 2115 UTC. The transmission was on 1.992 MHz using Upper Sideband WinDRM.

WinDRM is the successor of HamDREAM software. DREAM is an open software implementation of Digital Radio Mondiale, which was developed by the University of Darmstadt in Germany. It was later modified by Cesco, HB9TLK, to an amateur standard that fits into a narrower 2.5 kHz bandwidth. The software can be downloaded free from the web.

(GB2RS)

UK: Lifetime licence

UK telecommunications regulator, Ofcom, has announced its decision to restructure that nation's amateur radio service with a lifetime licence. That means once someone has passed the test, his licence is good until the day that he or she becomes a silent key.

Ofcom said it was taking the action to reduce the administrative burden on the UK's 63,000 amateur radio users. Under the new regulations, Ofcom will issue amateur radio licences which will remain valid for life as long as the licence details remain correct or until the licence is revoked by Ofcom or surrendered by the licensee. The agency will require licensees to confirm their licence details at least once every five years, but will also provide an online licensing service as an alternative to the postal service. The regulatory agency will also issue electronic licences to users of the online licensing service but will continue to make paper licences available, subject to an administrative charge.

At present, the Royal Mail processes amateur radio licences through the Radio Licensing Center. As of October 1st Ofcom will take over this function, which will include issuing, renewing and amending licences. Ofcom says that this new approach to amateur radio licensing will reduce unnecessary bureaucracy on what it calls a very popular international hobby.

We hope our government body ACMA takes notice and guidance from this development.

(RSGB)

ALARA *continued*

A DXpedition to Norfolk Island?

It seems there may be a DXpedition to Norfolk Island this year to help celebrate the sesquicentenary of the landing of the "Bounty" mutineers. ALARA has been invited to send a YL operator but nothing has been arranged to this date.

Watch this space for more information if and when it comes to hand.

Good Luck to the participants, in any case.

Do you realise how fortunate we are?

As radio amateurs, we can go into another room in our house and talk to our friends or find new friends, without having to drive to their place, or they drive to us.

Think about it.

If someone is off colour, we can call him or her and cheer them up. If someone is lonely they can find someone to talk to without leaving home.

Many nets keep people in contact at regular times, and the regular members let each other know what they are doing and why they may be missing for a while. We can quietly keep tabs on how we are coping with our problems so we, perhaps, know when a visit might help.

All the pain and strain of study is worthwhile.

DX News & Views

VK4OQ
P.O. Box 7665, Toowoomba Mail Centre, QLD 4352.
Email: john.bazley@bigpond.com

The Peter 1st Island DXpedition is now history. I hope you managed to work them at least on one band. The logging facility, which we have come to expect, enabling one to confirm that you are in the log, was a great asset.

Before we move onto other operations, it's worth recording the tremendous effort made by many people to put all the 3Y stations on the air. Bob Allphin, K4UEE, and Ralph Fedor, K0IR, co-lead a 22 member team. Worldwide, many others assisted and supported the operation. The 3Y0X boys were on the air for two weeks, with at times eight stations active, during which they made 87,034 QSO's. An absolutely superb effort.

It is all too easy, to sit in a comfortable shack and wonder why aren't they active now on a particular band, and at a particular time.

It is incomprehensible to a lot of Amateurs why certain people attempt to stop the operation by continuous jamming of their transmitting frequencies. What exactly are these faceless people trying to achieve? To stop the operation? To inconvenience as many people as possible? They did achieve inconvenience but they will never succeed in stopping an operation. There must be amateurs out there who have some idea where these transmissions are coming from. Recently, Roger, G3SXW made a plea for information regarding these people – so if you do have any information that can help track them down, please contact Roger, G3SXW QTHR.

I have mentioned the possibility of further operations from the Andaman Islands. The current news is that there will be at least two DXpeditions, one by K3LP who requests QSL's via W3ADC and the other by DL7DF who has also announced that he will be active with the following team and equipment: DL7DF, DK1BT, SP3DOI, SP3GEM and SP3CYY, 3 transceivers, a Titanex V80DX lowband vertical, a 5 band Hexbeam, a R7 and verticals for 30 m & 40 m plus laptops, filters etc.

The latter team will be heading to VU4 on April 15 to have enough preparation time. It appears that operating will be for 2 days April 18th to the 20th. QSL the latter operation to DL7DF.

The following précis of the KP5 operation is with the kind permission of Bernie, W3UR, the producer of 'The Daily DX'.

N3KS realised that in November 2005 equipment that his company supplied to the US Government was likely to be used in a planned operation near to Desecheo Island. He immediately 'volunteered' to help with the technical aspects of the operation and asked if when their operation was complete could they get permission to land him on Desecheo Island for an official amateur radio operation. Permission was granted just 6 days before the scheduled departure date! With the help of K3LP all the necessary gear was obtained. They planned for a 48 hour operation. Checking with the airline they could not guarantee acceptance of 16 items of luggage for both N3KS & K3LP. They decided to ship as much as they could afford by FedEx to be held at their offices in San Juan. Fortunately the rest of their luggage made it safely aboard the plane and they collected all the packages from the FedEx offices – so far so good.

With the gear now loaded aboard the vessel they prepared for departure at 0400 Thursday December 15th. By mid-day it was apparent that they would have an opportunity to land. The Captain stipulated that they would land by dingy and that they must set up camp in the vicinity of the helipad and must stick to the area between the landing zone and the helipad.

Access to the landing zone was through a 30' gap in the rocks on the SW side of the island, which is particularly hazardous due to 3 barely submerged rocks. The helipad was 300 yards across uneven rocky terrain, which also included a 6' sheer vertical climb. They decided to take only the absolutely essential items, including two generators, for if they needed anything else a second landing could be made. Thursday night was spent setting up camp and the radio equipment together with a temporary 40 m vertical and the 80 m vertical. N3KS decided to work 80 SSB and after 200 stations were in the log joined K3LP for some much needed sleep!

Then came the task of assembling the two BigSteppIr verticals. They operated during Friday, and then the bad news. A U.S. ham had contacted the U.S. Fish and Wildlife Services and demanded that they stop the operation. This request was made to both the Atlanta, Georgia and Washington DC offices. They were informed of this by the Captain of the vessel who also told them that they would have to end their operation the following evening. They then decided to maximise the number of QSO s and operated with minimal sleep until Saturday afternoon when they started dismantling the station.

Finally two quotes from N3KS.

I consider the complaints regarding the operation to be a shame, and certainly a violation of DXCC Rule 12 by the guilty "ham buddy" whoever he is but at the time we were in no position to negotiate.

In all we made 7,229 QSO's on 7 bands (6 with VK and 13 with ZL).

KVK Antenna Systems

The VK Antenna Handbook for Restricted Spaces
Packed with information on restricted space designs.

The NuBeam
As seen at Wyong, the reduced size multi-band 2-element beam.
Now you can buy it - 3 or 4 or 5 or 6-band NuBeam 10,14,18,21,28,52 MHz.
Nothing comes close. 7/10/14 MHz NuBeam available to. Imagine - a 7 or 10MHz beam no wider than 7m.

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fx 07-3216 8075

We regret not making as many QSOs in Europe and Asia as we would have liked. The combination of exhaustion and the unexpected shortening of the operation prevented us from taking time to round out the log with more areas of the world. Our congratulations to those who did manage to work us, and our apologies again to those who did not get the chance.

Now to forthcoming operations.

The 2006 DXpedition to Glorioso Island (AF-011) is again postponed. In February 2005, an outbreak of chikungunya (a form of viral fever spread by mosquitoes) hit about 20% of the residents on Reunion with 77 deaths linked to the virus.

A conditional clearance to organize the DXpedition to Glorioso (http://glorieuses2005.free.fr/) has been given by the military HQ on Reunion. But with the current local health situation (treatment nor vaccine are currently available for chikungunya), the organizers were advised to put it off until October or November.

WB5JAM, Bill, is heading back to St. Lucia and expects to be QRV with a J68 call this time. Look for activity after April 8th. He will be putting an emphasis on 30 metres. QSL via WB5JAM.

8Q7BO (Simon-M0BOX), will be active from 7th to 20th April, 40 metres to 10 metres inclusive on SSB, RTTY and PSK31. QSL to his home call.

3B8/ON4LAC (José) will also be active on SSB, RTTY and PSK31 from 17th March to 13th May. Please QSL via his home call.

VI9NI will be a special callsign from Norfolk Island from May 25th until June 20th to commemorate the 150 years since the landing of the HMS Bounty mutineers. The operation, by members of the Oceania Amateur Radio DX Group Inc., will be on 160 – 6 m CW, SSB and RTTY. There are still operator openings. If you would like to do some of the operating in this month-long event, contact the organizers at vi9ni@wstnet.com.au. Donations to cover shipping of equipment to Norfolk Island are also sought.

GUINEA-BISSAU. Peter, HA3AUI is QRV as J5UAP and is there for a few weeks. Lately he has been active on 15 and 17 meter SSB.

DXCC NEWS. The following operations have been approved for DXCC credit: T6X Afghanistan Current operation effective 8 March 2005; D2DX Angola Current operation effective 15 December 2004; TS3A Tunisia 24-28 March 2005; TT8PK Chad 27 December 2005 - 11 February 2006; XW1A Laos Current operation effective 29 October 2005; XW1LLR Laos Current operation effective 29 October 2005; XW1X Laos Current operation effective 29 October 2005; XW1M Laos Current operation effective 29 October 2005.

Special thanks to the authors of *The Daily DX* (W3UR) and 425 Dx News (I1JQJ) and QTC DX PY2AA for information appearing in this month's DX News & Views.

For interested readers you can obtain from W3UR a free two week trial from www.dailydx.com/order.htm

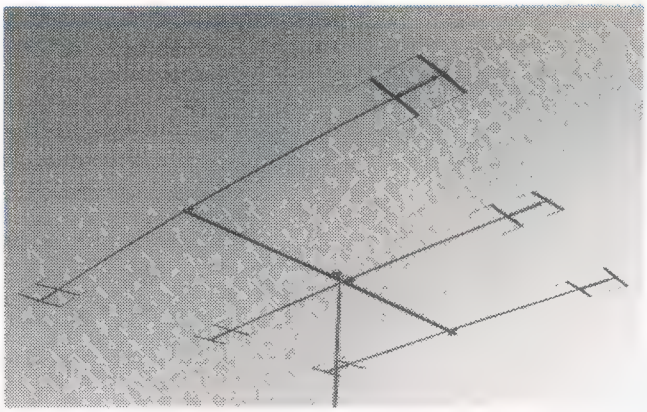
ar

TET-EMTRON

NEW!

TE-33M THREE ELEMENT TRI-BAND MINI BEAM

If you haven't got the room for a full size three element beam, but you want more gain than the two element TE-23M, then this is for you.



SPECIFICATIONS	
FREQUENCY	14, 21, 28 MHZ BAND
MAX.ELEMENT LENGTH	5520 MM
BOOM LENGTH	4.0 M
GAIN	6 / 6 / 7 DBI
FRONT TO BACK RATIO	20/ 15/ 14 DB
FEED IMPEDANCE	50 OHM
TURNING RADIUS	3.74 M
WEIGHT	12 KG
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*ALL 6000 SERIES ALUMINIUM CONSTRUCTION.
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RECOMMENDED RETAIL PRICE
ONLY $858 INCL. GST

If you already have a TE-23M, you can purchase the extension kit containing extra boom, director element, and everything you need to upgrade to this antenna.

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News from...

VK5

Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY

It was the AGM in February. There were more nominees for the committee than needed so a ballot was conducted. However, the nominee who missed out was co-opted onto the committee to continue the task he had undertaken!

The Committee is now, President Jim VK5NB, Vice-President John VK5EMI, Secretary Leith VK5QH, Treasurer Hans VK5YX, and committee members Jim VK5JST, Barry VK5ZBQ, and Christine VK5CTY, co-opted member Dale VK5DC.

The Dennis Grieg Award was given to Jim VK5JST in recognition of the world-wide use now being made of his "antennalyser". Letters of admiration for the instrument have been coming in thick and fast. Unfortunately Jim was not well enough to attend the meeting that night so the presentation of the plaque was made at his home the next day. Well done Jim.

Presentation of the Dennis Greig Award to Jim VK5JST by Jim VK5NB

A photo marks the occasion (though Jim was not feeling or looking his best that day).

At the request of Dennis' widow, one of the plaques was also given to Christine VK5CTY in recognition of the important part her OM Geoff VK5TY had played in AHARS over the last 14 years before his untimely death last year. It was accepted on behalf of the family and will always be a reminder of how important the club was to Geoff.

Several smaller presentations were made in recognition of services to the club. Items bought at the RSGB headquarters will now be used instead of sitting idle.

A world Callbook was given to John VK5EMI to help him in his continuing DX chasing.

The RSGB Journal Archive was given to Jim VK5JST as a keen AR archivist.

A book of Antenna Topics was given to Greg VK5ZBD in appreciation for his video recording of the club speakers, with perhaps a sly dig at the number of antennas that sprout over Greg's home. Hi. Hi.

At the end of the AGM a general meeting was held during which a minute's silence was held for Doug VK5DUG who became an SK recently. Doug had been a stalwart of the club for many years undertaking many tasks on the club's behalf.

A short talk was given that night by Rob VK5RG about the amount of technical information that is available in the various radio magazines on sale around the world.

He mentioned such topics as the accuracy or otherwise of a comparison of forward and reverse power when tuning up; using an inverted Vee versus a horizontal dipole; bar LEDs versus analogue SWR meters; the importance of the height above ground of an antenna, the problems of suburban backyards and much more food for thought.

He recommended members avail themselves of some of these books in the club library and in the bookstalls, perhaps so as to appreciate these topics when they come up in discussions.

Lower Murray Amateur Radio Club

Christine Taylor VK5CTY

The LMRC is planning to have a display station at the Mannum Show this year, so if you are planning to go there make sure you look for them and give them some encouragement. Alternatively listen out for them at the time.

They are also planning to start up a regular 2-metre net on the RMB repeater to accompany their regular 80-metre net.

These sorts of activities are encouraging for the continued growth of amateur radio.

Harry Angel Memorial Contest

April 22

Fleurieu Peninsula Group

Christine Taylor VK5CTY

This group met again for a luncheon at the end of February and later repaired to the home of Garry VK5ZK for coffee.

A new couple attended, Harry VK5HR and his XYL Clare. Harry is a commuter like you wouldn't believe, travelling between Goolwa and Nhulunbuy, spending a little less than half his time up north and the rest down south.

As usual the range of topics of conversation was very wide, but something overheard suggests that Garry ALMOST made a 2-metre contact with a ZL station using, what they decided afterwards, was a combination of meteor scatter and tropospheric propagation. Maybe next time Garry.

It is usual for the amateurs to migrate to Garry's shack. The photo is all of us gathered in the shack. The radio gear is hidden behind the bodies!

VK3

Amateur Radio Victoria News

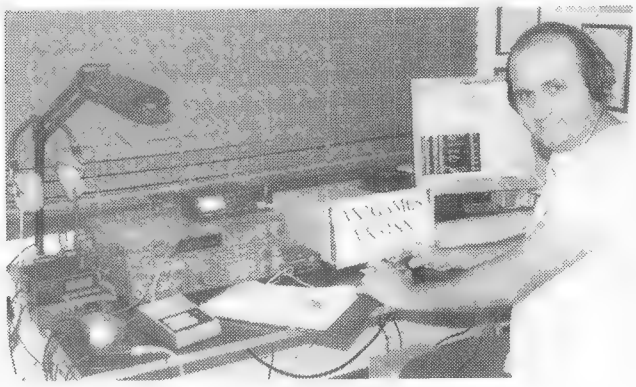
Website: www.amateurradio.com.au
Email: arv@amateurradio.com.au
Jim Linton VK3PC

Commonwealth Games Stations

At the time of writing these notes, the two Commonwealth Games special event callsigns, AX3GAMES and AX3MCG, were in their final week of operation. By any measure it has been possibly the most successful such activity for many years.

Although the contact and country tally of the 17 rostered members of Amateur Radio Victoria won't be known until all logs are in, there are thousands of QSOs and as well a long list of countries worked.

The next big task now under way is to collect suitable images. Perhaps a few members who attended the Commonwealth Games might like to send a few of their photographs - particularly of competitors.



One of the 17 operators to activate AX3GAMES is Stjepan Nikolic VK3TSN

Catch-Up Post-Games

An enormous drain on resources and other dislocations occurred in Victoria for many months prior to and during the Commonwealth Games. Lots of people, both professionals and volunteers alike, had commitments to this major sporting event and associated cultural activities.

For example, the long overdue replacement of an antenna for the North-East Victoria repeater VK3RNE faced further delay because riggers were fully committed with the Games and also at a correctional centre installing various lighting, surveillance, communications and other services.

It also put back planned work at Amateur Radio Victoria rooms, 40G Victory Boulevard, including cabling for an upgraded computer system and installation of a 'club' radio station.

The ARV Council at its March meeting approved the necessary expenditure for the installation of antenna cabling and masts. The station will be useful in terms of instruction and licence assessments for prospective radio amateurs, and be available for WICEN (Vic).

Membership grows

Currently we have 670 financial members (including Life Members) and fairly soon the first major renewal notices will be issued as part of the new two-year membership cycle.

News from...

VK3 *continued*

As new computer and software updates have not been able to be installed, it has been decided that renewal dates for members falling due before 1 July, 2006, will be extended.

Currently 520 registered members have access to the member's website and also receive monthly e-news bulletins, occasional other news and special offers. If you have an email address please register for this extra stream of membership services.

AGM next month

Those registered for the members' website will be receiving their notification of the annual general meeting and annual reports electronically. Copies will be mailed to those without email and are also available in hard copy on request.

The AGM date is Wednesday 24 May 2006 at 8.00 pm – St Michael's Hall, Victory Boulevard, near the corner with High Street, Ashburton.

As only five nominations for the 2006-09 Council were received, there will be no need to conduct an election. The nominations are Barry Robinson VK3JBR, Keith Proctor VK3FT, Peter Mill VK3APO, Ross Pittard VK3FCE and myself.

Jim VK3PC

VK2

Tim Mills VK2ZTM.

Members of AR-NSW should by now have received the posting of Notice, reports and agenda for the AGM which will be held on Saturday, 22nd April.

Over Easter, the annual Urunga Convention will be held at the Mid North Coast village of Urunga. It commences Saturday morning and concludes Sunday afternoon. It has several fox hunts, both vehicle and on foot. The hall is the centre of the social side of the Convention. Visitors should make their own arrangements for accommodation.

It is still a couple of months away, but mark up the calendar for the Oxley Region Field Day over the June long weekend in Port Macquarie.

Several clubs and groups are now providing Foundation training and assessments. So that as many likely candidates as possible are informed, would you let VK2WI NEWS know of the dates, location and contact point so that it can be included in the news sessions. At the same time, you should approach your local electronic parts sources, local media - print and radio, and the community notice boards in shopping centres.

The benefit of surge suppressors came to the fore with another storm passing over VK2WI, mid February. On the FAX machine was a combined telephone - power version you plug into a power outlet. The FAX survived intact but the unit was toasted on both sides of the protection circuits. Other damage was mainly to switching chips. All continuous running power circuits have had their surge suppressors replaced to give them all a new start in protection. At less than $10 for a power only, and up to $20 for a combined power and telephone unit, they are a good investment.

73 VK2ZTM.

VK7

Justin Giles-Clark, VK7TW
Email: vk7tw@wia.org.au
Regional Web Site: reast.asn.au

Athol Johnson Memorial VHF Contest

Remember this contest? It was run from 1960 to 1982 and was a VHF contest in memory of Athol Johnson, VK7AJ who became silent key in 1959. Following the NTARC AGM in February, the perpetual trophy was found. The names that appear on the trophy are a who's who of VK7 VHF amateur radio. In Athol's short time as an amateur (1947-1959), he was acknowledged as one of Tasmania's most progressive VHF amateurs with outstanding skill and technical knowledge. We are currently locating the rules with a view to possibly resurrecting the contest. Watch this space!

Winston Churchill Fellowship Report released

Mike Harris, VK7ACQ, has completed and released the report of his 2005 Winston Churchill Fellowship project entitled, *A study of new opportunities for Australian Radio Amateurs made possible by changes in the Amateur Radio Licence conditions.* Mike travelled throughout the US and UK gathering information about amateur radio and modes that are not prominent within Australia. The report is available at: www.pangolin.co.nz/downloads/churchill_project.pdf

BPL Interference Watch

Hobart BPL trial emission measurements have been published. Measurements were taken on 20 m in Mt Nelson, Tolmans Hill and North Hobart BPL trial areas using a mobile station and the FSM software developed by Owen Duffy, VK1OD. The conclusion reached is that measurements clearly show that there is a degradation of the noise floor in the trial areas. This is caused by emission levels ranging from 19dB to 45dB above the measured ambient noise floor. The chart is available from VK7 BPL Watch Pages at: http://reast.asn.au/vk7bplwatch.php

Northern Tasmanian Amateur Radio Club

At the NTARC AGM in February Life Membership was bestowed upon Allen, VK7AN, for his tireless work in the club and Brian, VK7RR, for his repeater contributions. A big thank you to Joe, VK7JG, for not once, not twice, but three times climbing Mt Arthur to fix the repeater and thanks also to Brian, VK7RR, who has generously donated a new 6dB collinear antenna for VK7RAB.

North West Tasmania Amateur Radio Interest Group

Planning for the Marconi Centenary Celebrations is progressing. It will be a four day event commencing on Wednesday 12 July to Sunday 16 July 2006. A reminder of Spectrum Tasmania broadcasts on Monday and Thursday nights at 19:30 local. Spectrum receives reports from all states of Australia as well as New Zealand. There are two new NW APRS digipeaters on VK7RAE (Don Heads) and VK7RAC (Table Cape). Both are on the National APRS Frequency of 145.175 MHz.

Radio and Electronics Association of Southern Tasmania Inc.

The Domain clubrooms are open every Friday evening from 18:30 local onwards, and the radio gear is just screaming out for new Foundation licensees to come up and use it! There is a fully licensed operator available to assist and Friday nights are also the computer and network users group meeting, so you can also learn a thing or two about computers. We now have a fast broadband connection available on all our PCs at the Domain clubrooms for members.

REAST now offers a five dollar subscription to full time students who are the second or subsequent REAST member in a household. So - if you've been holding back paying out another twenty five dollars, here's a way to enjoy all the benefits of REAST membership. Talking of membership we reached our 100th member in Tom, VK7FTAA, at the AGM: congratulations Tom.

February saw another three Foundation licensees, congratulation to Chris, Bruce and Megan. Angela and Andrew also passed their practical assessments for their standard licences. We also welcome Ian Ellings, VK7QF, as REAST's second FL assessor. A reminder that Foundation Licence Manuals and CDs are now available for purchase from McCann's Model World in Elizabeth St, Hobart.

The linking of VK7RAD (Queens Domain) with VK7RHT (Snug Tiers) is now fully operational thanks to Dave, VK7DM, and his band of repeater experimenters.

At our March meeting Phil Tompson, VK7SS, from Novaris gave us a detailed illustrated talk on all aspects of lightning, its effects, analysis of strikes on structures, relevant standards and models used to simulate a strike. Phil also covered the research, current protection standards, methods and devices. Thanks to Phil for giving up his time and it was great to see over 30 amateurs along.

Moorabbin and District Radio Club

VK3APC HAMFEST 2006

Saturday 13th May 2006

at BRENTWOOD SECONDARY COLLEGE

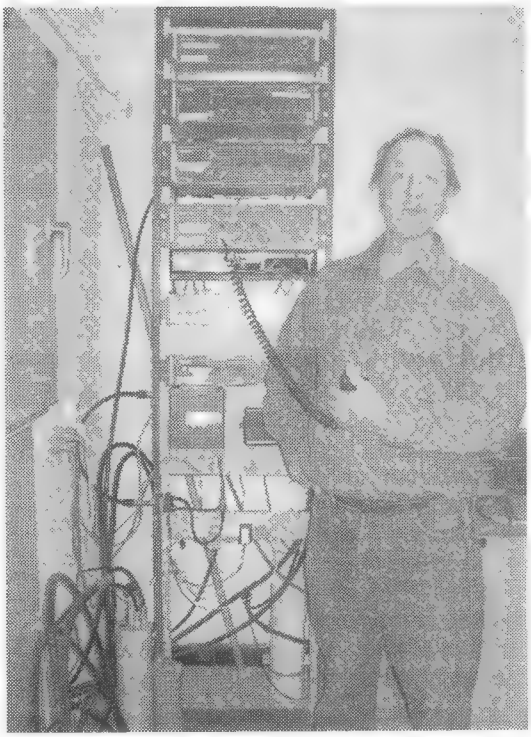
Watsons Road, Glen Waverley.

Melways Reference 71 D7

(Enter via Heath Street)

Webpage

www.mdrc.org.au



Dave VK7DM, REAST's Repeater Officer (& guru) standing next to VK7RAD!

Phil, VK7SS explaining the finer details of lightning protection.

Contests

Ian Godsil VK3JS
WIA National Contest Co-ordinator

Contest Calendar April 2006 – June 2006

April	1/2	Marconi Contest	(CW/SSB/RTTY)
	1/2	SP DX Contest	(CW/SSB)
	1/2	EA WW RTTY Contest	
	8	QRP Hours	(CW/PSK31/SSB)
	8/9	Japan Intl. DX Contest	(CW)
	16	Holyland DX Contest	(CW/SSB)
	15	TARA Skirmish Digital Prefix Contest	(PSK)
	22	Harry Angel Sprint	(CW/SSB)
	22/23	SP DX RTTY Contest	
	22/23	Helvetia Contest	(CW/SSB)
May	6/7	CQ-M Intl. DX Contest	(CW/SSB/RTTY)
	13	VK/trans-Tasman 80 Metres Phone Contest	
	20/21	Baltic Contest	(CW/SSB)
	27/28	CQ WW WPX Contest	(CW)
	27	VK/trans-Tasman 80 m CW Contest	
June	10	ANARTS WW RTTY Contest	(Digi)
	10	Portugal Day DX Contest	(SSB)
	10/11	South America CW Contest	
	10	Asia-Pacific Sprint Contest	(SSB)
	17/18	All Asian DX Contest	(CW)
	24/25	Marconi Memorial HF Contest	(CW)

Greetings to all contesters

As I begin these notes I am listening to the ARRL DX CW Contest and I am again reminded what a surge of joy can flow through the nervous system at hearing so many stations across the world each doing their bit to contribute. I hope that many of you will feel something of that as you work our local events.

We hope and believe that everyone is being honest and working "in the spirit of the contest"; but we must also recognise that advancing technology can blur the lines.

In this context, I was saddened to hear that some people in the Ross Hull Contest "used the Internet to complete contacts". This is a quote from someone who had himself taken part, then saw the Internet exchanges and decided that he could not submit an entry knowing that such practices had taken place.

How sad from an idealistic point of view – how typical from an everyday viewpoint. Nevertheless, it shows that there are those who still have scruples about using modern technology correctly.

A more difficult area is the WW contests. CW QSOs are done entirely by the logging programme (with the option of manual sending usually available). I know people who regard this as not in a contest's spirit; but it is now widely practised, like automatically giving 599/59 reports irrespective of real signal strengths.

I conclude this section by hoping that all of us in VK and ZL will be honest and at least discreet if we should be on the borderline between older and newer practices.

Short and Sweet – QRP Again

You have seen me refer previously to the challenge presented by using low power on the HF bands. Within Australia this can be either hard or easy – easy if you are happy to work within your State and hard if the east coast is trying to work the west.

To put these ideas to the contest, the CW Operators' QRP Club will run a brief contest called "QRP Hours" (see details below).

Because the Club supports all forms of QRP work, it invites all licensed HF operators to join in on this occasion. Please note date and times in your diary now – you will be very welcome.

A check of the dates above will show that there will be several local contests in April. Now is the time to check that your station is working at good efficiency and that you, the operator, are comfortable in your operating position.

Only the other day I learnt that the 10th March was apparently the 30th anniversary of the founding of the Radio Amateurs Old Timers' Club Inc. To mark this occasion the Club will hold a QSO Party later in the year. Please keep watching for details, especially if you are a member of RAOTC.

Finally

My thanks to John Spooner, VK4AJS, for the Jack Files 2005 results below. This year's event will be on 15th July and even though this is in memory of a VK4 amateur (as is the Harry Angel Sprint), it is still open to us all as a recognition of the contribution of such people. Please give these contests your full support.

Also thanks to John Martin VK3KWA for the VHF results.

Good contesting and 73,

Ian Godsil VK3JS

Results of the 2005 Jack Files Memorial Contest.

A good response was shown to the revised Contest format in 2005. Changes were made to try to encourage more people to participate and to bring the contest to more of a national level and not just a VK4 based contest. All feedback received was positive so hopefully word will spread and we will see even more stations joining in 2006.

I must also apologise for the delay in releasing the results. I have shifted QTH, changed email address and had an almighty computer crash in the last 12 months and all 3 events factored towards the delay.

The results for the Jack Files 2005 are as follows.

Overall Winner

VK4TAA Peter Richardson with 1656 points

State winners

VK2 – VK2LCD	Chris Meagher with 1425 points
VK3 – VK3JS	Ian Godsil with 1365 points
VK4 – VK4TAA	Peter Richardson with 1656 points
VK7 – VK7VH	Vince Henderson with 1368 points.

Club Station Winner

VK4BAR with a massive 3060 points.

Congratulations to the winners and a big thankyou to all who participated and submitted logs for the 2005 contest. Certificates will be sent to the winners promptly.

I am hoping to see a big increase in numbers this year boosted by the new Foundation Licence introduction.

73s

John Spooner VK4AJS
Contest Manager

Results of the 2005 Wadda Cup

And the winner of the old mug is VK2BPL

The Central Highlands Amateur Radio Club of Tasmania (CHARCT) 2005 80m Dash for the Wadda Cup Contest has been won by Paul Linsley, VK2BPL. Paul is no stranger to contesting and now will add the Wadda Cup to the growing list of contests that he has conquered. Paul came 7th last year and has improved that to first place with 21 points this year. Congratulations Paul on a fine win and we look forward to hearing you next year as the on-air coordinator and operator of VK7CHT/2.

Second place with a score of 19 points was Vince Henderson, Vince was 10th last year and improved his place to second. Great effort with only 2 points separating first and second. Vince will receive the Wadda Cup second place certificate. Well done Vince.

Third place was a three-way tie between Dale Whatley VK3YR, Frank Clark VK7CK and John Laan VK3MGZ. Well done Dale, Frank and John.

The contest was held on Saturday evening, 24th September 2005. Conditions during the contest were generally very good. Most operators were receiving strong signals. There were some steady static crashes during the event and this made contact between distant stations a little difficult. The event is meant to be friendly and fun. It turned out to be just that as many people commented that the Wadda Cup Contest is their favorite event, full of friendly people and heaps of fun. It was also good to see Chris VK3TCC and his sister Rachael VK3HRC who are 12 and 13 yrs old respectively in the contest. Well done Chris and Rachael with only half an hour operating time each on their father's station. Should be more of it.

The contest Call-back was held on 3.585 MHz immediately after the contest concluded. It was very well supported, considering the number of stations that participated in the score roll call. There were many stations, making just a few contacts, which did not participate in the call-back. We thank them for joining in the contest. If you do have a go at the 2006 contest, even if you make just a few contacts, we encourage all stations to give their score during the on-air score call-back. The score call-back is unique to the Wadda Cup Contest and as far as we know, it is the only contest in the world that has this type of format.

VK7CHT/3 (CHARCT club call sign) was operated by Rob Ashlin, VK3EK, the winner of the 2004 event.

We also thank Vince Henderson, VK7VH and Paul Linsley, VK2BPL, for their relay assistance during the contest call back. This ensured that we had reasonable coverage, for gathering contest scores, around Australia.

Unfortunately the cup will not be run in 2006. To all that took part in the 2005 Wadda Cup Contest, CHARCT says thank you. Your participation is the reason that the event was so popular.

Bob Geeves,
President,
Central Highlands Amateur Radio Club of Tasmania.

Harry Angel Memorial Sprint

Saturday 22 April, 2006 1000z – 1146 UTC

This is an annual Contest to remember VK's oldest licensed operator, Harry Angel. Please note the time length of the Contest–106 minutes, Harry's age when he died in 1998. It is open to all HF operators.

Object is to make as many contacts as possible on 80 metres, using modes CW and SSB. Categories: Single Operator (CW, Phone, Mixed) and SWL. Frequencies: CW: 3500 - 3535 kHz, Phone: 3535 - 3700 kHz. Contacts in DX window not permitted. Exchange RS(T) and serial number starting at 001.

Score two points per CW QSO and one point per Phone QSO.

Stations may be worked once only per mode. Logs must show time UTC, callsign worked (both callsigns for SWLs), mode, RS(T), serial numbers sent and received for each QSO. Send summary sheet showing name and date of Contest, name and callsign of entrant, category entered, address, points claimed and a signed declaration that the rules and spirit of the Contest were observed. Send logs to Harry Angel Sprint, 363 Nepean Highway, Chelsea, 3196, by Friday, 12 May, 2006. Logs may be sent via email to: vk3js@bigpond.com

2006 VK/trans-Tasman Contests - Rules

Helpful Hint *(Particularly regarding "Scoring")*: These Rules cover a variety of operator circumstances, so use a marker pen to highlight those parts that are only applicable to you.

Contest Dates

80 m Phone	(Cat 1, 2, 3 and 6)	Saturday 13th MAY
80 m CW	(Cat 4 and 5)	Saturday 27th MAY
160 m Phone	(Cat 7 and 8)	Saturday 8th JULY
160 m CW	(Cat 9)	Saturday 22nd JULY

Time: 0800 UTC to 1400 UTC, (in 6 one-hour stages).
Note: Best 5 hours to count (refer "Scoring").

Aims of Contest

a). to provide a reasonably short event that doesn't impose too much on family life or sleep time, while giving 6 hours of constant on-air activity.

- to have a format suitable for both the serious and the novice Contester, with a friendly and relaxing atmosphere.

b). to have a fair scoring system that:

- compensates for geographical location, usable band time and the difference in participation numbers between VKs and ZLs to provide a level playing field for all, so far as is possible.
- places the main emphasis on VK/ZL contacts, by awarding bonus points for "trans-Tasman" contacts.
- provides incentive for the clever Operator, by awarding additional bonus points for working groups of "call-prefixes", in any hourly segment.

c). to promote/give encouragement to QRP operators, Foundation Licence holders, and SWLs.

General

a). The Contest is open only to all VK and ZL call-signs.

b). The Contest shall be in 6 X 1 hour stages, and stations can only be reworked after the commencement of each hour. However, stations worked during the 5 minutes

WANTED

Suitable cover photo for the

2007 WIA Call Book

Post to Box 2175
Caulfield Junction 3161
or email to: callbook@wia.org.au

Eastern and Mountain District Radio Club Inc

WHITE ELEPHANT SALE

Sunday 9 April 2006
10.30am

Great Ryrie Primary School
Great Ryrie Street
Heathmont
(Melways 49 K11)

before the hour cannot be reworked until 5 minutes after the hour.

c). Sequential numbers commencing at 001 shall be given and received for all contacts made during the Contest. (Use of RST numerals is NOT required).

Note: Contest detail, Rules, a suitable log sheet, and auto-scoring logging programs are available on the Contest web-site:

http://home.iprimus.com.au/vktasman

Any queries or constructive criticism should be attached to the Log or emailed to:vktasman@hotmail.com

Bands

80 metre band, (May, Phone/CW).

160 metre band, (July, Phone/CW).

Frequencies

80 m Phone:	3.535 to 3.625 MHz
80 m CW:	3.500 to 3.550 MHz
160 m Phone:	1.835 to 1.875 MHz
160 m CW:	1.810 to 1.840 MHz

Notes:

- It is not in the spirit of the Contest to "park" on a frequency. While this will not be policed, 20 minutes is considered to be the maximum time between QSYs.
- It is not in the spirit of the Contest to make contacts with another station at the same QTH, or in the immediate vicinity thereof.

Modes	LSB (DSB optional for QRP),CW.
Max. TX Power	LSB: 100 watts pep. (QRP 5 watts pep, LSB or DSB / Foundation Licence 10W pep LSB). CW: 100 watts pz. (QRP 5 watts pz / Foundation Licence 4W pz).

Categories

Cat 1. Single Operator	80 m Phone (Not incl Foundation Licence holders)
Cat 2. Single Operator	80 m QRP Phone (Also eligible to enter Cat 1)
Cat 3. Single Operator	80 m Phone (for Foundation Licence holders - also eligible to enter Cat 2).
Cat 4. Single Operator	80 m CW
Cat 5. Single Operator	80 m QRP/CW (Also eligible to enter Cat 4)
Cat 6. Shortwave Listener	80 m SWL
Cat 7. Single Operator	160 m Phone
Cat 8. Single Operator	160 m QRP Phone (Also eligible to enter Cat 6)
Cat 9. Single Operator	160 m CW

Note: no separate Category for 160 m QRP CW.

Multi-Operator

a). Club/Group stations shall be permitted to enter any Category, on the proviso that only ONE Operator is used during each 1-hour segment, to perform ALL functions without assistance. (ie: TX/RX; log and time-keeping). - 2 to 6 Operators may be used.

b). Club/Group stations must score at least 100 points more than a Single-Operator station, to have outright claim to any prize (including a VK/ trans-Tasman Trophy). If the leading margin is less than 100, a Certificate(s) will be shared equally with the Single-Operator station, but the Trophy will be awarded to the Single-Operator station only.

Call-signs

a). VK4s north of the Tropic of Capricorn shall add "Central" after the suffix of their callsign for all contacts.

b). QRP/Phone stations shall add "Quebec" after the suffix of their callsigns for all contacts.

c). QRP/CW stations shall add "/Q" after the suffix of their call-sign, for all contacts.

Scoring

a). The final score shall be the sum of the five (5) highest scoring hourly segments, with the lowest scoring hourly segment not counted.

Note: This gives the ZLs the option of working only 5 hours, if they choose not to stay up until 2am to try and improve their score. It gives VK6s (who have only 3 hours competition after 7pm), 5 hrs to complete a full Log, if they choose not to start until 5pm to avoid poor propagation at the start of the Contest.

b). VK shall be divided into 3 zones (for scoring purposes):

"East"	VK1, VK2, VK3, VK4 (south of Tropic of Capricorn) VK7and VK9
"Central"	VK4 (north of Tropic of Capricorn); VK5 and VK8
"West"	VK6 and VK0

c).

VK to VK - except VK (East) to VK (West)		= 3 pts
VK (East) to VK (West)	= 3pts + 3 (distance)	= 6 pts
VK (East) to ZL	= 5 (distance) +1 (band time) + 5 (bonus)	= 11 pts
VK (Central) to ZL	= 7 (distance) +2 (band time) + 5 (bonus)	= 14 pts
VK (West) to ZL	=10 (distance) +3 (band time) + 5 (bonus)	= 18 pts

d).

ZL to ZL		= 3 pts
ZL to VK (East)	= 5 (distance) + 5 (bonus)	= 10 pts
ZL to VK (Central)	= 7 (distance) + 5 (bonus)	= 12 pts
ZL to VK (West)	=10 (distance) + 5 (bonus)	= 15 pts

(ie: 5 bonus points awarded for each trans-Tasman contact)

e). During each 1 hour segment, additional bonus points shall be awarded as follows:

VK	working	4 X VK call prefixes -each group	= 20 bonus pts
VK (East)	working	3 X ZL call prefixes - each group	= 30 bonus pts
VK (Central)	working	3 X ZL call prefixes - each group	= 40 bonus pts
VK (West)	working	2 X ZL call prefixes - each group	= 35 bonus pts
ZL	working	3 X ZL call prefixes - each group	= 18 bonus pts

ZL	working	3 X VK (East) call prefixes - each group	= 30 bonus pts
ZL	working	2 X VK call prefixes from VK (Central and/or West) - each group.	= 30 bonus pts

Notes: "Call Prefixes" are identified by the numeral in the call-sign prefix, (except when over-ridden by a "portable" or "mobile" addendum to the suffix, that indicates operation outside the "home" call area). eg: VK3RX port5, and VK4TZ mob5, would both be regarded as VK5s.

"Groups" - each prefix numeral can be used only once in each "group" - each call-sign can be used only once in a group, per hourly segment. Typical examples:

(VK2 + VK3 + VK7)	= a "3 X VK (East) group".
(ZL1+ ZL3 + ZL4)	= a "3 X ZL group"
(VK4/Central + VK6) or (VK6 + VK8) or (VK5 + VK6), etc.	= a "2 X VK (Central and/or West) group" (applies only to ZLs).

If more than one required "group" of call prefixes is worked in any hourly segment, bonus points are awarded for each "group". (eg: VK/East working two groups of "3 X ZL" call prefixes, in one hourly segment, = 2 X 30 = 60 pts). VK working three groups of "4 X VK" call prefixes in one hourly segment, = 3 X 20 = 60pts).

Help? Download sample scored log sheet from Contest web-site, or use the auto-scoring computer Logger (ref Home-page menu).

f).

Base station to QRP	= 2 bonus points to each station.
QRP to Base Station	= 2 bonus points to each station.
QRP to QRP Station	= 4 bonus points to each station.
QRP using personally home-brewed RX & TX equipment, (including kits)	= 1 bonus point per contact.

g). SWLs: To score, the callsigns and contact numbers of both stations in a QSO must be received and logged. SWL stations shall score as for Amateur stations, except that scores shall be calculated for both stations in each QSO. Notwithstanding that, as with Amateur stations, each call-sign shall be scored once only, in each hourly segment (this also applies when calculating scores for "call-prefix groups").

h). ***Note:*** "Participation Factor"- (to be applied by Contest Manager): The number of participants on either side of the Tasman has a direct effect on the ability to score points from "across the Tasman", - a compensating factor shall therefore be applied in each mode Category, to all "trans-Tasman" contact points (not call prefix groups bonus points), scored by the Country with the lowest number of participants. The factor is the "lowest number of participants" divided by the "highest number of participants" - ("participants" being the total number of stations that participated, from all Logs received, in any one mode Category). eg: 50 ZLs divided by 150 VKs = compensating factor 0.33. - All ZLs "trans-Tasman" points X 0.33.

Logs Note:

- Log sheets can be downloaded from the Contest web-site.
- Written Logs can posted, or be scanned and emailed.
- Computer logging systems (providing information as below), can be emailed.

a). A separate Log shall be submitted for each Category entered, except that QRP Logs may be used for other eligible Categories.

b). A new log sheet shall be used at the commencement of each hourly segment. Number each Log sheet (eg: 2 of 6).

c). For each contact, logs shall record call-sign of station worked; numbers given and received, and UTC time (10 hrs behind EAST). To the right, leave columns for "contact" points. At the bottom provide space to record hourly "contact" sub-total; bonus point sub-total, and "hourly" total. (calculate scores after the Contest).

d). If six (6) hours are contested, the Log sheet for the lowest-scoring hourly segment shall still be submitted for cross-checking, but shall be indicated as "not included in final score", by writing "LOWEST SCORING HOUR" on top of the relevant page(s).

e). Logs, or log entries that are not clearly legible, in the opinion of the Contest Manager, or which are lacking the required information (including scoring and a Log Summary), may be included in the Results, at the discretion of the Contest Manager, but will be ineligible for prizes.

Note: Entrants are requested to take the time to submit a proper Log, rather than a "Check-log", which serves little or no purpose, and does not support the viability of the Contest.

Log Summary

a). Logs shall include a Log Summary, showing:

Name	Phone number (optional)
Address	Category(s) entered
Email address (if available)	Total points score claimed

b). VK4s in "Central" zone shall identify as such at the top of their Log Summary sheet, by writing "Central" after their call-sign suffix.

c). QRP stations claiming points for "personally home-brewed" TX and RX equipment (incl. kits), shall indicate accordingly on their Log Summary, to qualify for "home-brew" bonus points.

d). Multi-operator entries shall identify as such, in their Log Summary, after their call-sign. eg: VK7DF (Multi)

It will be assumed that all entrants submitting a log will have contested in compliance with the Rules, - including operation at the appropriate power output, - and in the "spirit of the Contest", (unless determined otherwise by the Contest Manager). No written declaration is required.

Lodgement of Logs

a). Logs must be received either by post, to: VK/ trans-Tasman Contest, 28 Crampton Crescent, Rosanna, VIC. 3084 AUSTRALIA. or by email to:vktasman@hotmail.com in either "Word doc", Excel", or scanned hand-written (if

legible). Use "text file/Notepad" only if above formats are not available.

b). Closing Dates for receipt of Logs shall be at 0700 UTC on

7th June, 2006	(80 m Phone/SWL)
22nd June,2006	(80 m CW)
2nd August, 2006	(160 m Phone)
16th August, 2006	(160 m CW)

Note: Operators are requested to submit their logs (even if you have a low score, and don't think you will win). This will justify the effort and expense involved by the Contest Manager, and ensure the on-going success of the Contest.

Awards

VK/trans-Tasman 80 m Trophy:	Highest Log score submitted in any one 80 m Category - (ref Multi-operator Rule)	
Certificate 80 metres	1st	Phone
Certificate 80 metres	2nd	Phone
Certificate 80 metres	3rd	Phone
Certificate 80 metres	1st	QRP Phone
Certificate 80 metres	1st home - Foundation Licence holder	
Certificate 80 metres	1st	CW
Certificate 80 metres	2nd	CW
Certificate 80 metres	3rd	CW
Certificate 80 metres	1st	QRP/CW
Certificate 80 metres	1st	VK
Certificate 80 metres	1st	ZL
Certificate 80 metres	1st	SWL
Certificate 80 metres	Night-owl's award - (Top Phone score in 6th hour)	
Certificate 80 metres	Paddle-pumper's award -(Top CW score in 6th hour)	
Certificate 80 metres	Wooden Spoon award - (Lowest Log score)	
VK/trans-Tasman 160 m Trophy:	Highest Log score submitted in any one 160 m Category - (ref Multi-operator Rule)	
Certificate 160 metres	1st	Phone
Certificate 160 metres	2nd	Phone
Certificate 160 metres	3rd	Phone
Certificate 160 metres	1st	QRP/Phone
Certificate 160 metres	1st	CW
Certificate 160 metres	2nd	CW
Certificate 160 metres	3rd	CW
Certificate 160 metres	1st	VK or ZL (if not the Trophy winner)

Publication of Rules and Results

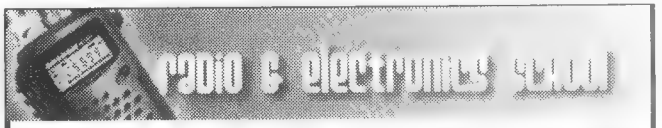
a). Rules will be published on the Contest web-site: http://home.iprimus.com.au/vktasman . There are links to this site on the: www.vkham.com (under "Radio-related links > DX Contest Information"), http://www.wia.org.au/ WIA Federal web-site, and most VK State web-sites, www.nzart.org.nz NZART web-site, http://www.vk4dx.com/ Contest web-site. Rules may be published in "AR" and "Break-in" magazines.

b). Results will be published on the Contest web-site and links there-to, by the following dates:

80 m Phone and SWL	10th June 2006
80 m CW	25th June 2006
80 m overall results/prize-winners	28th June 2006
160 m Phone phone	5th August 2006
160 m CW	19th August 2006
160 m overall results/prize-winners	22nd August 2006

Results will also be published in "AR" and "Break-in" magazines.

ar



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AMSAT

Bill Magnussen VK3JT

AMSAT-VK Echolink Net welcomes the OZSAT Group

On Sunday 12th Feb 2006, the AMSAT-VK group net on Echolink welcomed members of the OZSATgroup.

The OZSAT group (Australian Satellite Enthusiasts Group) is a YAHOO! group and they have a site in the YAHOO! Groups area of the internet. They can be reached at <www.ozsatgroup.info> and you can join the group or read the messages at that site.

Several members were welcomed to the AMSAT-VK net during the Echolink session and later in the evening on the 40 m HF net. The two groups have much in common and a spirited discussion of OSCAR matters resulted. It's hoped that quite a bit of overlap will occur between the two groups and they will become mutually supportive, perhaps with many shared members.

The re-activation of the HF net that evening resulted in some good discussion. It was thought that despite the vagaries of HF propagation disrupting any HF Australia-wide net, that it might be worthwhile going back to a weekly net meeting time rather than monthly as it is at present. Participation dropped off markedly when we went from weekly to monthly nets, perhaps a return to weekly nets may reverse this trend. What do you think? Please contact Graham or myself if you have any firm ideas on the subject. We'd like to make a decision on this as soon as possible and advertise any new arrangements.

Many of the OZSAT group are keen HF operators and this may be a good opportunity to breathe some new life into the HF nets which were the life-blood of AMSAT-VK in the days before the Internet and WWW. (Yes – believe it or not, just 10-12 years ago there was a time before the Internet and the WWW). Out here in the sticks where the only access to the Internet and WWW is via a 28k dial-up line, a lot of the finer points of on-line comms pass us by. I'm sure I'm not alone in this matter. HF scheds form a great part of my own satellite information gathering.

The AMSAT group in Australia

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an e-mail mailing list for important breaking news and such things as software releases and sched reminders. Contact Graham if you wish to be placed on the mailing list. As a forum for members AMSAT-VK operates two monthly nets.

AMSAT-Australia Echolink Net

The "Echolink" net meets formally on the second Sunday of each month. Anyone with an interest in Amateur Radio Satellites is welcome to join in and take part. Graham VK5AGR acts as net controller. The net starts at 0500UTC during summer time periods and 0600UTC during winter (standard) time periods. You can join in by connecting to the AMSAT conference server a few minutes before these times.

AMSAT-Australia HF net

The HF net meets formally on the second Sunday of each month. In winter (end of March until the end of October) the net meets on 3.685 MHz at 1000UTC with early check-ins at 0945UTC. In summer (end of October until end of March) the net meets on 7.068 MHz at 0900UTC with early check-ins at 0845UTC.

- All communication regarding AMSAT-Australia matters can be addressed to:

  AMSAT-VK,
  9 Homer Rd,
  Clarence Park, SA. 5034

  Graham's e-mail address is:
  vk5agr@amsat.org

Exciting news from AMSAT-UK

Graham G3VZV has reported the initial stages of an exciting new satellite project involving AMSAT-UK, the SSETI Association and ESEO, the European Student Earth Orbiter.

ESEO is a satellite planned for launch in late 2008 into a Geo-stationary transfer orbit similar to the initial orbit of AO40 and to those planned for Eagle and P3E.

Graham reported that in December 2005, two AMSAT-UK members were invited to attend a SSETI meeting/workshop at the European Space Agencies ESTEC facility in the Netherlands. The meeting lasted a week and over eighty students from more than twenty European universities attended.

At the meeting the involvement of the AMSAT-UK team with the project was officially confirmed and recognised. The entire team were elected as "Honorary Members" of the SSETI Association in appreciation of their work supporting the previous SSETI Express project. This is a welcome and fitting outcome for the effort put in by the AMSAT-UK SSETI team. We will all owe them a great deal if this project comes on line as planned in 2008.

The ESEO comms system will initially use commercial "S" band space frequencies but it has need of a redundant communications system, one that can operate in the event of a primary system failure but can also function satisfactorily if/when the spacecraft is not in its intended earth-pointing mode.

This is where AMSAT are planning to assist. The current project calls for a unit that can receive telecommands from earth on UHF (435 MHz) and transfer those to the OBC. Additionally, it must transmit telemetry and mission data to the ground on S-BAND (2.4 GHz). The team plans to use omni-directional antenna systems and a power output of 9 watts.

Now here's the interesting part as far as we are concerned. When in orbit, it is likely that the student experiments will be completed within a few weeks or maybe months from launch, after which time the spacecraft and its electronics will become available to amateurs as a linear mode U/S transponder. Power should be no problem. The solar panels will be deployable and steerable, while the propulsion system will use Nitrogen gas.

It's not without some newer technology

either. The 50 kHz wide mode U/S transponder will be switchable from a conventional linear design to a fully digital design based on DSP techniques using the G6LVB STELLA firmware. Two UHF canted monopoles on opposite ends of the spacecraft will be used to receive signals on U band. The S Band output of 9 watts will feed two turnstiles or quadrilifar helixes. As well as the transponder, the unit will also provide 400 bps BPSK telemetry in AO-40 format. So don't let the dust settle too thickly on your old 400 bps decoders and keep the software in working order. Signals won't be quite as strong as AO-40 in its hey-day but it should compare favourably with AO-13 and that was a very workable satellite. You'll most likely need to have a reasonably high gain tracking system on both U and S band.

The AMSAT-UK team includes G4DDK, G7OCD, G6LVB, G0MRF, & G3VZV who were responsible for the S-Band transmitter on SSETI Express. They all deserve our accolades. Due to their willingness to provide SSETI's initial project with real, live, "S" band hardware and vital advice at very short notice, we may well have another high orbiter on which to "work the world". Watch the SSETI web site for breaking news as it happens.

Thanks to Graham G3VZV for this exciting news. I don't know about you but I can't wait to hear the sweet sound of the 400 baud AMSAT telemetry again.

Space Golf!

The Russians are at it again. There is a rather unusual commercial enterprise planned to take place on and from the ISS in the near future. It involves an international golf equipment manufacturing company.

A crew member will hit a "golf ball" out into space during a spacewalk. That's if NASA approves the safety aspects of the "experiment". So what's that got to do with amateur radio satellites? Maybe nothing, maybe everything.

It's a bit reminiscent of the ill-fated Swatch episode of many years ago. According to the spin doctors the "ball" (no-one's quite sure how big it's going to be) is somehow going to carry a transmitter of some kind and be trackable by GPS from stations on the ground. There is no indication at present of how this is going to be achieved and the whole thing is a bit hush-hush. The Swatch episode was similarly quite secret until it suddenly began transmitting in the 2m amateur satellite band. It was ultimately shut down being deemed quite inappropriate. BADR-1 was another example of this type of piracy.

It's to be hoped that this golf advertising effort isn't going to be a repeat. With a bit of luck NASA won't allow it.

Nano-satellites come and go

The current series of nano-satellites is the latest in another possibly worrying trend. They are really tiny palm-of-the-hand sized devices with a lot of electronics packed inside. They are put together as part of a course of study in space engineering science at various universities.

I don't know how others feel about this but it is somewhat controversial. I have no problem with the idea of hands-on education of this kind, it's laudible, it's not new and it must be invaluable to students in the field, but where does amateur radio fit in? They are certainly an exercise in miniaturisation but it's difficult to see how many of these projects advance the state of the art in amateur radio satellites in any way.

Many people I speak to on this subject are of the opinion that the amateur radio component is just a cheap way of obtaining an otherwise quite expensive communications system for the controllers.

The projects are almost invariably short lived, sometimes lasting only days or weeks and there seems to be no long-term planned objectives in any amateur radio sense, the projects sometimes being switched off after the initial telemetry collection.

Contrast this trend with the AMSAT-UK involvement detailed above with the SSETI Association and its latest project ESEO. This is a co-operative effort of potentially enormous value to both SSETI and AMSAT. These and similar projects like the Surrey digital satellites of the 1980s and 90s had a planned amateur radio function inbuilt and ongoing. They fulfilled their primary aim of high level technology transfer from Surrey to various other countries and when that mission was complete they went on to be of immense value to the advancement of the state of the art of amateur radio satellites. Systems developed during those projects are finding a place in the current series of flagship AMSAT birds.

Perhaps some of the later examples could take a leaf out of Surrey's book and include some valuable, well planned and ongoing amateur radio functions, or apply for and pay for commercial frequency access for their private projects.

"Hey, Old Timer..."

If you have been licensed for more than 25 years you are invited to join the

Radio Amateurs Old Timers Club Australia

or if you have been licensed for **less than 25 but more than ten years**, you are invited to become an **Associate Member** of the RAOTC.

In either case a **$5.00** joining fee plus **$8.00** for one year or **$15.00** for two years gets you two interesting OTN Journals a year plus good fellowship.

Write to
RAOTC,
PO Box 107
Mentone VIC 3194
or call Arthur VK3VQ on **03 9598 4262** or
Bill VK3BR on **03 9584 9512**,
or email to raotc@raotc.org.au
for an application form.

VHF/UHF – an expanding world

David Smith VK3HZ – vk3hz@wia.org.au
Leigh Rainbird VK2KRR – vk2krr@wia.org.au

Weak Signal

David Smith - VK3HZ

Most of the good propagation during February has been across the Bight with numerous tropo enhancement openings between VK6 and VK5/VK3/VK2. Unfortunately, for many hours, the VK6 beacons could be heard bleating away at good strength, but not a VK6 station to be heard. If anyone is thinking of retiring to the southern WA coast, then please take your VHF/UHF station with you, as you'll have a busy time during the summer season.

Brian VK5UBC reports: *The last week of February has provided some excellent conditions to West Australia from both VK5 and VK3. I first heard the Albany beacons last Sunday 26/2. They were then audible morning and evening until Wednesday morning 1/3. During this period many contacts were made with Wally VK6WG in Albany on both 2 m and 70 cm. Stations to work Wally included VK3II, 3AXH, 3HZ, 3XPD, 3WN, 5UBC, 5NY, 5ZBK & 5DK. Signals from Wally in VK5 were often S9. Roger VK5NY also worked Wally on 23 cm.*

During this period I also worked Frank VK6DM (Albany) simplex on 146.5 FM as well as via the Albany 2 m repeater VK6RAL.

Things were then quiet for a couple of days until Saturday evening when again the Albany 2 m and 70 cm beacon were into VK5 up to S9. First contacts were made on Sunday morning (5/3) when I again worked Frank VK6DM via the Albany repeater and FM simplex 5/7. Bob VK6BE (Albany) was worked on SSB 5/5. Later in the morning Roger VK5NY worked Wally 6WG on 2 m, 70 cm and 23 cm.

Sunday evening again provided strong signals into VK5 from the Albany beacons but unfortunately there were no operators available in the Albany area. The Katanning VK6 repeater was also heard.

On Monday 6/3, things really hotted up. I was able to hear the Mt Saddleback VK6RMS repeater at 6 am and was fortunate enough to catch Max VK6ZER passing his radio at 4.30 am WA time. Wally VK6KZ in Perth was sent a text message and he next came up on the repeater. We then tried the Mandurah repeater 6RMW and this was better still. Wally got Don VK6HK out of bed and he came up on the repeaters. Conditions were also exceptional between VK3 and VK5 and, although I had the beam west, I was also accessing the Mt Macedon repeater and had VK3s calling me. Brian VK5UBC found he could hear the Bunbury and Perth 2 m beacons but despite several attempts with Don VK6HK, contact wasn't made. Don did hear Roger VK5NY but unfortunately Roger couldn't hear Don due to his noise level. Finally, after several hours of calling Cec VK6AO in Perth came back to me on 144.1 SSB. Contact was completed with signals 5/2 over a distance of 2150 km.

Several other VK6s were worked on the Mt Saddleback VK6RMS repeater. They included VK6IQ, ZER, HRC & TFL.

Conditions to the west finally faded at about 10.30 am SA time.

Thanks to Brian for that comprehensive report. As demonstrated, it is often handy to have a good FM setup when the 2 m band opens up. Repeaters can act as useful (triggerable) beacons and are much more widespread than beacons, although the re-use of frequencies in different areas can cause some confusion as to which repeater is being triggered. A vertically-polarised Yagi (in addition to the weak-signal horizontal one) is desirable to both reduce repeater interference and eliminate cross polarisation losses that occur if a horizontally-polarised Yagi is used with a vertically-polarised repeater. Although contacts via repeaters do not qualify for distance records, they can, of course, be used to set up direct SSB contacts.

Ian VK3AXH reports that on 28/2, he worked Wally VK6WG on 2 m and 70 cm. Wally was stronger on 70 cm (S9) than 2 m. They attempted a contact on 23 cm but, although Wally reports hearing something, no contact was made. At the time, there was no sign of Wally in Melbourne, only 150 km further on. As an indication of how localised conditions can be, Kevin VK3WN, only 4 km from Ian, could barely hear Wally on 70 cm, although he did work Wally later in the day. Colin VK5DK who is virtually under the path between Ian and Wally, reports not hearing much at all. Half an hour later, Wally was worked in Melbourne on 70 cm by VK3XPD and VK3HZ.

Beacons

Ed VK3BG reports that there are two new beacons active in the Cobram area.

VK3RTC on 432.534 MHz is on test, running 12 watts into a vertical omni antenna at 15 m AGL. Keying is a repeated one-minute sequence - carrier for 1 second, CW ID twice at 10 wpm, carrier until 30 seconds then key off until 60 seconds.

The 1296.534 MHz beacon is within 2 kHz of nominal freq, but will need trimming until the crystal ages. The keying sequence is the same as the 70 cm beacon. It is running with 5 watts out to an Alford Slot at 7 m AGL.

Reception reports would be appreciated to Ed at vk3bg@bigpond.com.

TEP Contacts

Finally, a report on contacts using a propagation mode only available to those in the very north of this country – Trans Equatorial Propagation.

On 26/2, Phil FJ5DX on St Barthelemy Island in the French West Indies worked PP5XX, PU5YFT, PY5EW and PY5HOT in southern Brazil on 2 m. The contact with PP5XX was over a distance of more than 5100 km.

The remarkable thing is that the equipment at Phil's end consists of an IC706MKIIG (50 W) into a 5/8 vertical at 3 m above the ground. One can only think that a TEP opening must provide very strong conditions.

The current VK 2 m distance record was set in 1991 with a TEP contact between VK4BFO and JI7DMB over a distance of 6763 km.

Please send any Weak Signal reports to David VK3HZ at vk3hz@wia.org.au.

Digital DX Modes

Rex Moncur – VK7MO

Congratulations to Guy VK2KU on working the Peter 1 Island DXpediton 3Y0X on two metres with JT65. Rod ZL3NW and Joel F6FHP achieved a new 6 m EME World record on 3rd March 2006 using JT65A over approx 19,440 km path.

Dave VK2AWD and Rex VK7MO have been seeing the video carriers of the Channel 5a TV stations at Mawson WA on 138.250210 MHz and Newcastle NSW on 138.276025 MHz via EME. Signals are best copied when the moon elevation at the TV station is on the horizon but can be detected up to around 8 degrees. The stations are seen on a waterfall program such as Spectran or Spectrum Lab with a resolution of around 0.1 Hz. It should be possible to see these stations with a single 10 element 2 metre Yagi although elevation might be required. The Newcastle station is extremely stable and provides a useful calibration reference if your 2 metre receiver will tune down to 138 MHz. Its frequency has been compared to a GPS locked reference and has been within 10 milli-Hz over several weeks with the actual frequency being measured at 138.276025 MHz to an accuracy of better than 0.1 Hz. The signal is almost always available by tropo-scatter in Hobart at a distance of 1162 km by using a very narrow bandwidth of 2 milli-Hz, as is available on Spectrum Lab. It should also be detected via meteors at distances up to 2300 km and by averaging one can establish a frequency comparison via meteors with an accuracy of within a few Hz.

Please send any Digital DX Modes reports to Rex VK7MO at rmoncur@bigpond.net.au.

The Magic Band – 6 m DX

Brian Cleland – VK5UBC

After the good openings to VK6 in early February reported in last month's notes there has been very few openings reported. Beacons have been heard for short periods occasionally but there have been only a few contacts reported. The only contacts in my log since early February are on 28th February with Neville VK2YO near the Queensland border and Daryl VK4ADM at Maroochydore.

Norm VK3DUT reports despite hearing the ZL TV on many days in February the only contact was with Bob ZL3NW on 7th Feb. Norm also worked Neville VK2YO, Harvey VK4AHW and VK4YRP on the 2nd March.

John VK4FNQ in Charters Towers reports similar lack of openings only working VK5UBC on the 2nd February and John VK2BHO on the 10th. Gary VK4ABW in Townsville also has reported little activity working only one VK2 in February but reports the MUF is reaching the high 40 MHz region with signals from the North/North West being heard.

Jack VK2XQ advises activity into the Sydney area during February has also been poor with only the odd beacon and ZL TV being heard. Mick VK2BZE did work ZL3NW on 7th February.

Norm VK7AC (ex VK2ZXC) near Launceston worked VK4AHW, ARS & TWR on the 2nd March.

In summary a very quiet February/ early March on 6 m.

Bob W6BYA well known Californian 6 m op spent some time with Peter VK4APG in early January and had a get together at Scott's VK4CZ QTH with a few of the local 6 m operators who've worked Bob over the years.

Left to right: Tom VK4DDG; Bob W6BYA, Alan VK4WR, Scott VK4CZ and Peter VK4APG.

Please remember to send any 6 m information to Brian VK5UBC at bcleland@picknowl.com.au.

2 m & 70 cm FM DX

Leigh Rainbird - VK2KRR

Well folks, I think I'll make this my last FM DX column. While it's been fantastic reporting all the rare FM DX openings from around Australia over the past few years, I feel it's now time to move on.

I got handed the reins of the VHF column directly from David VK5KK, and kept the column running with the introduction of the initially controversial 2 & 70 FM DX Report. Fortunately, not long after this was able to team up with David VK3HZ, who provided the Weak Signal segment, then Rex VK7MO for Digital Modes and recently Brian VK5UBC for Six Metres.

When the FM DX segment started, the Novice licensees were limited to the use of FM only on the 2 m and 70 cm bands. Now with the licence changes which have recently been implemented, these Novice operators are now free to use weak signal modes as well.

The purpose of the FM DX column was primarily to help promote VHF DX to those operators, who at the time were not licensed to use SSB, or who only had FM radios. It also served to dispel a few 'myths' about FM that some believed, such as, 'you can't make DX contacts on FM' and 'vertically polarized antennas are no good for DX'. Well, I think I have raised awareness and helped create a lot more activity in the process.

If anyone is interested in compiling the FM DX column, please contact David VK3HZ or myself VK2KRR via email.

DX openings during February 2006, were mostly found in southern Australia.

On 3rd February there was a massive tropo opening in the south east. Mount Gambier repeater was 5/9+40 here at 633 km. Mt Gambier IRLP repeater was 5/9. Most 2 m repeaters in the Adelaide area and surrounds peaked out at full scale. The Port Lincoln repeater was 5/9 at 1019 km.

2 m FM simplex contacts were completed with VK5MM, VK5UBC, VK5PO, VK5HS, VK5ZCB. Signals were so strong on the 144 MHz band, that I was able to copy pictures sent using MMSSTV from Garry VK5ZK 754 km from Goolwa and from Brian VK5UBC 764 km from Gawler.

On 20th February another good opening occurred in the south, this time extending into Western Australia, though no FM contacts were made that far.

I had quite a few VK5 repeaters coming in - Crafers, Central North (833 km), Cowell (961 km), Port Lincoln (1019 km), Murray Bridge, Barossa Valley, Houghton, Lobethal and Mt Gambier.

In the evening of 27th February, some VK5UBC magic was about. Brian was able to access the Albany repeater VK6RAL at 1900 km on 146.725 MHz. Here, Brian worked Frank VK6DM. The two went to FM simplex on 146.500 MHz and made a weak 4/2 contact at around 1900 km.

Then on Sunday morning 5th March, Brian VK5UBC again made the 1900 km trip to the Albany repeater and again worked Frank VK6DM. They then went to 146.500 simplex, where signals were much better at 5/7. In the evening, Brian was able to hear the Katanning VK6RAW repeater at 1950 km.

Picture sent using MMSSTV on the 144 MHz band

On the morning of Monday 6th March, Brian was easily able to work into the Boddington VK6RMS repeater on 147.250 at 2062 km. Early on, Brian was lucky to catch Max VK6ZER on the repeater. Later, Brian was also able to work VK6HK, VK6KZ, VK6IQ, VK6HRC and VK6TFL. During the same opening, Brian VK5UBC also worked to the Mandurah VK6RMW repeater at 2102 km where he again worked VK6KZ and VK6HK. At the same time Leigh VK2KRR was also able to hear the Boddington repeater at 2817 km up to only 4/1. The signal did not get strong enough to work the repeater, which was quite unfortunate.

Thank you to all of you who have sent in FM DX reports during my stay, and those who have made nice comments in regard to the content of the column. Much appreciated. 73 and good DX.

ar

Over to you

Are we accepting lower standards?

I'm currently listening to 7.070 MHz. The time is 19:20 EDT. I find the operations by some licensed amateurs and perhaps a pirate station is appalling. Operators, and I use the word loosely, making threats at each other, whistling over each other and discussing tracking operators down to sort them out!

It sounded like the 27 MHz CB band back in the mid-seventies.

I can remember when amateurs took pride in their operating practices and gentlemanly behaviour. If this is what it is to become why anyone would be attracted to the hobby unless perhaps they are an ignorant thugs. It appears to me and I know I will be condemned for this, but we seem to have been accepting lower standards in more ways than we expected.

I believe that simply ignoring these operating practices and these operators will allow segments of the bands to become no-go ghettos. A completely unacceptable and un-Australian outcome.

I also believe that the looming threat to this great hobby come from within as much as from outside forces, and therefore suggest that something akin to Intruder Watch be applied to monitoring amateur operations as I think the authorities response will be that we need to self regulate.

I am offering this observation for discussion and will be keen to see what others think!

Peter VK3YSF

The views expressed in the *Over to you* column are those of the authors, and do not necessarily reflect the official policy of the Wireless Institute of Australia.

Robin Harwood VK7RH

It's official ...

We are at the minimum of the current Sunspot cycle and propagation can only increase now. I have read some indications that the next peak should be 30 to 50% higher than the last peak. Only time will tell.

I know I have been really praising the www.dxtuners.com website in recent columns, but it is so good. Now I have come across a new station from a country I have only heard once before. It is Ethiopia and the only time prior to this was in the 60's when I heard a very weak religious station in English in the 19 metre band. It said it was a Gospel station in Addis Ababa, presumably when the Sudan Inland Mission ran a station. After the 1977 revolution, a pro-Marxist dictatorship ruled the country and Ethiopia eventually drifted into anarchy and civil war.

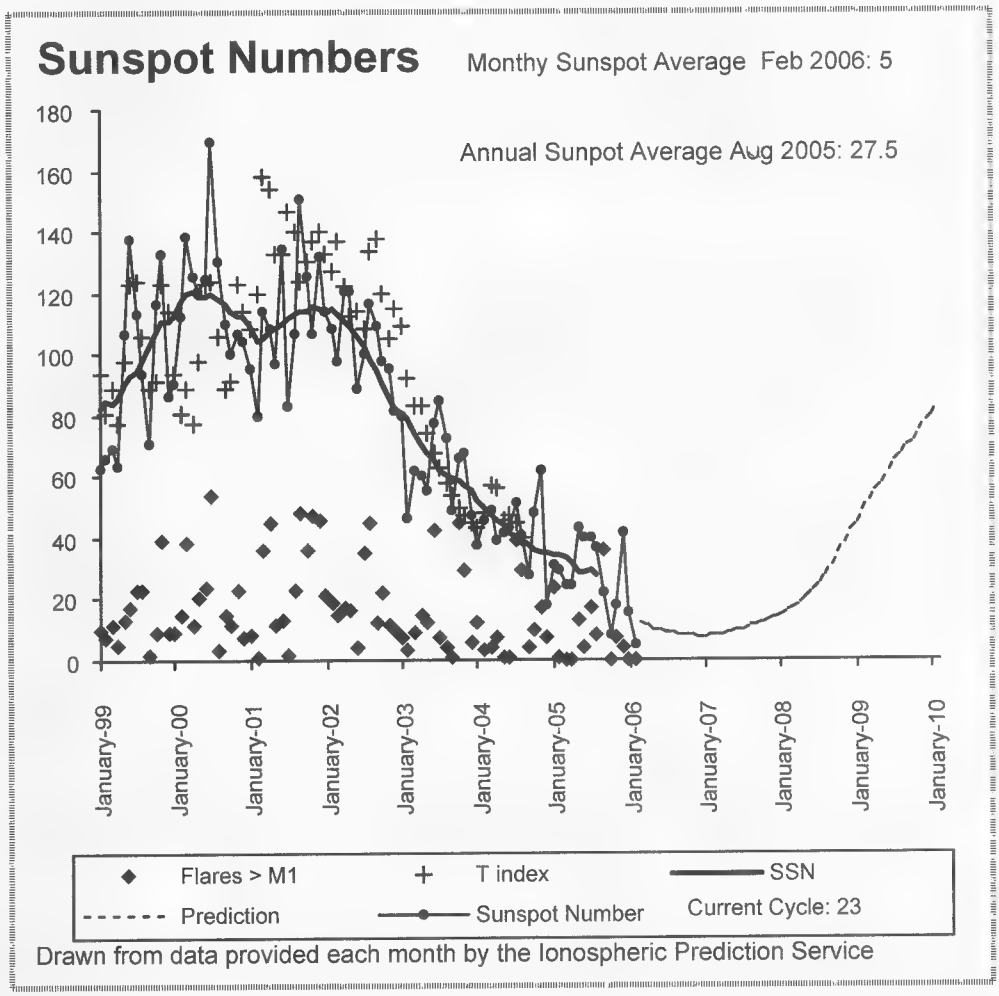
Recently I came on a signal on 6940 via the Johannesburg Dxtuners site at 0330 and initially I thought the station was identifying itself as Radio Farda, the American clandestine station targeting Iran. News items frequently mentioned Iran and Pakistan. I even enlisted a friend within the Indian Ocean region and he too thought it was Radio Farda. However Glenn Hauser pointed out to us it was Radio Fana and indeed on the 7th of March, I caught the station signing on at 0300 on 6940 as Radio Fana. So I did what comes naturally these days and looked up Google. Sure enough, it directed me to www.radiofana.com which is indeed in Addis Ababa in Ethiopia. The website was very useful and confirmed the frequency and stated that the station has been operational for ten years. What surprised me is that Radio Fana is also on 6210 and it also came through the dxtuners sites. Sadly there is no propagation from Ethiopia at 0300 here in northern Tasmania . Perhaps in midwinter I will be able to hear it direct.

After more than 70 years of continuous operations, the northern Tasmanian ABC regional radio station, 7NT, in northern Tasmania on 711 kHz, ceased broadcasting on AM. It is now on 91.7 MHz FM. A three-week period of grace saw the MW signal simulcast with the FM output but officially 7NT closed down at 0006 UTC on March 7th. I believe other MW stations in Launceston will also be converting to FM later in the year or early 2007.

Have you noticed that the BBC World Service has adopted a rolling news format? This means many favourite programs have been axed, including "Calling the Falklands", a special program that became prominent after the Argentine invasion in April 1982.

The escalation of broadcasters leaving shortwave has continued. The program makers seem to think that streaming via the Internet is the way to go. However one station discovered that their audience actually plummeted after opting for Internet streaming. Radio Tashkent in Uzbekistan was heard lamenting their audience had disappeared since they went on the Net in December. I wonder if they will now reappear on shortwave?

Well that is all for now. You can reach me at vk7rh@wia.org.au or snail mail at 20/177 Penquite Road, Norwood Tasmania 7250.



HF Predictions

by Evan Jarman VK3ANI
34 Alandale Court Blackburn Vic 3130

These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.
These frequencies as identified in the legend are:-

- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

Shown hourly are the highest frequency amateur bands in ranges between these key frequencies, when usable. The path, propagation mode and Australian terminal bearing are also given for each circuit.
These predictions were made with the Ionospheric Prediction Service program: ASAPS Version 4

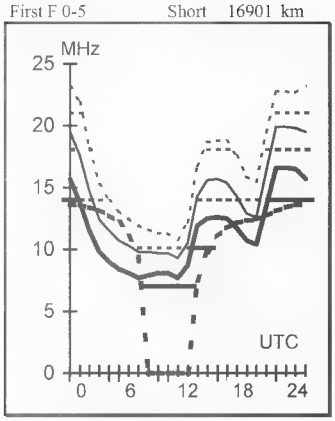
April 2006
T index: 15

Legend

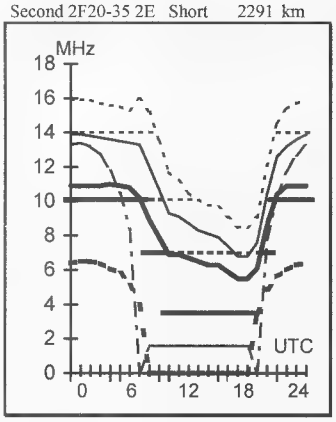
Frequency scale: UD, F-MUF, OWF, E-MUF, ALF, >10%, >50%, >90%

Time Scale

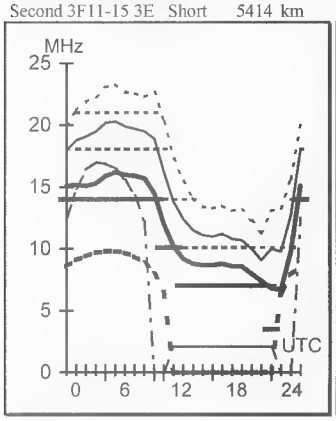
Adelaide-Ottawa 58
First F 0-5 Short 16901 km



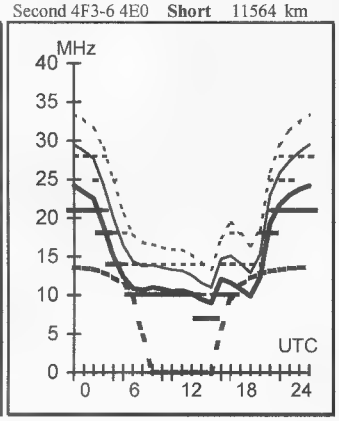
Brisbane-Auckland 123
Second 2F20-35 2E Short 2291 km



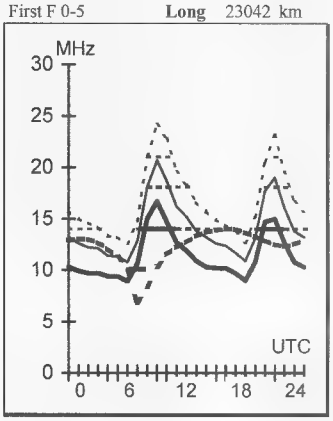
Adelaide-Singapore 311
Second 3F11-15 3E Short 5414 km



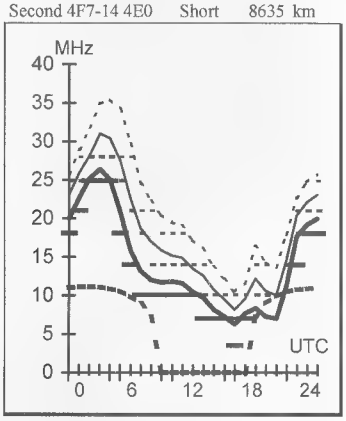
Brisbane-Los Angeles 59
Second 4F3-6 4E0 **Short** 11564 km



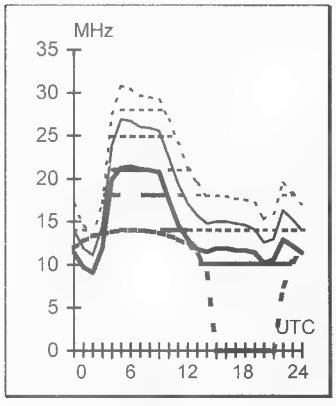
Canberra-London 136
First F 0-5 **Long** 23042 km



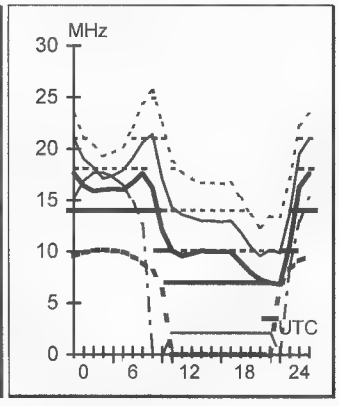
Darwin-Honolulu 65
Second 4F7-14 4E0 Short 8635 km



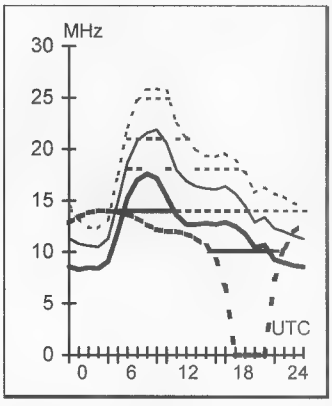
Adelaide-Tel Aviv 291
First F 0-5 Short 13125 km



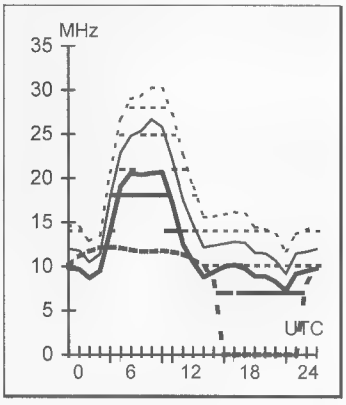
Brisbane-Manila 320
Second 3F9-16 3E1 Short 5811 km



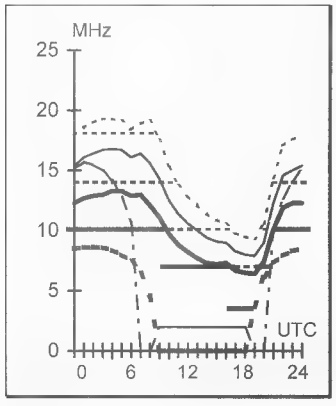
Canberra-London 316
First F 0-5 Short 16982 km



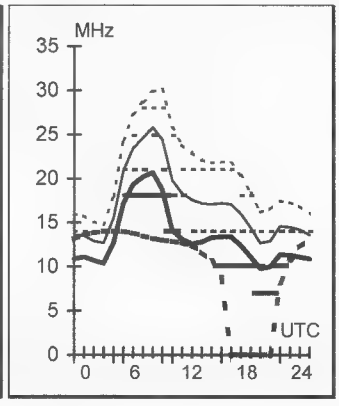
Darwin-Johannesburg 241
Second 4F4-9 4E0 Short 10639 km



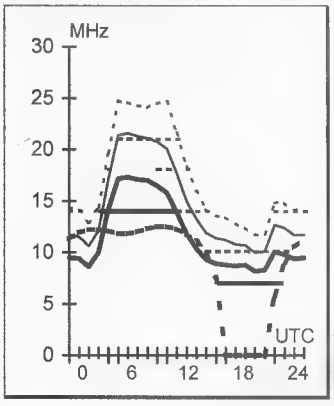
Adelaide-Wellington 114
Second 2F13-17 2E Short 3214 km



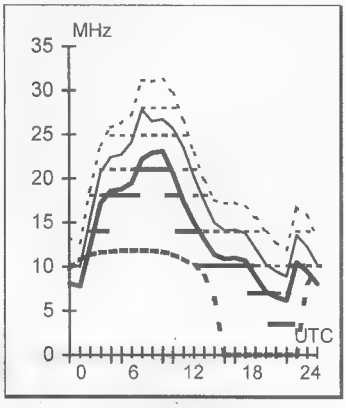
Brisbane-Rome 305
First F 0-5 Short 16107 km



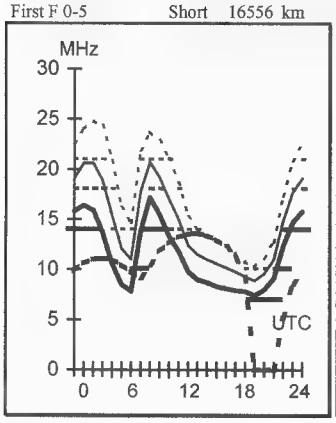
Canberra-Pretoria 231
Second 4F4-7 4E0 Short 10824 km



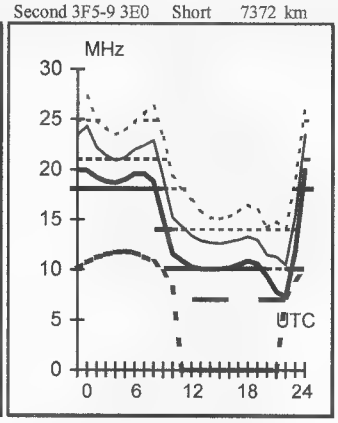
Darwin-Riyadh 295
Second 4F5-10 4E0 Short 10000 km



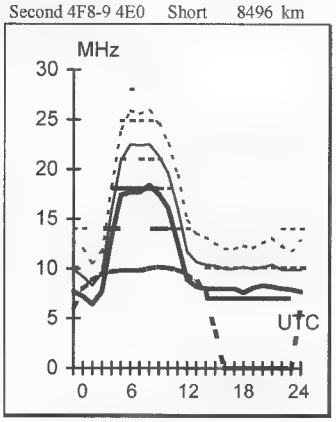
Hobart-Dakar 209
First F 0-5 Short 16556 km



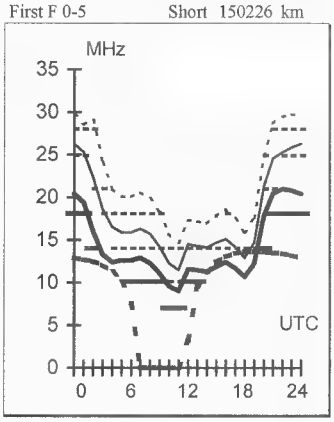
Melbourne-Bangkok 312
Second 3F5-9 3E0 Short 7372 km



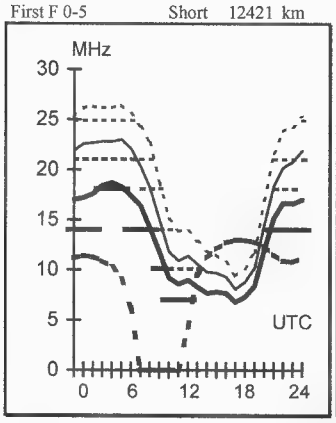
Perth-Harare 257
Second 4F8-9 4E0 Short 8496 km



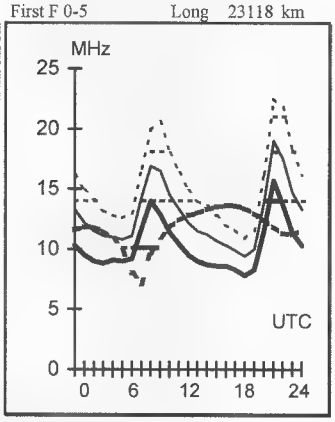
Sydney-Miami 86
First F 0-5 Short 150226 km



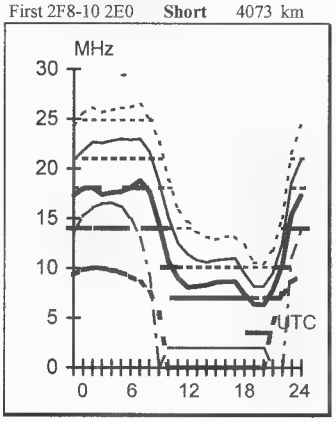
Hobart-Lima 133
First F 0-5 Short 12421 km



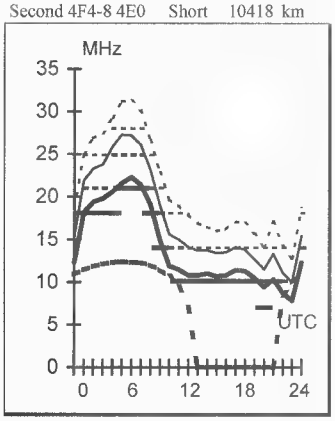
Melbourne-London 131
First F 0-5 Long 23118 km



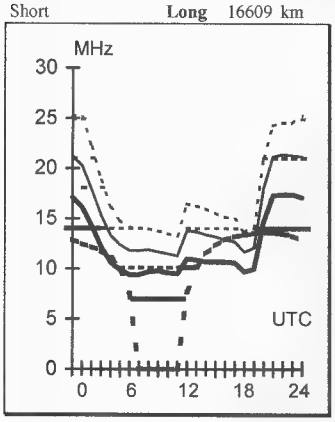
Perth-Port Moresby 59
First 2F8-10 2E0 **Short** 4073 km



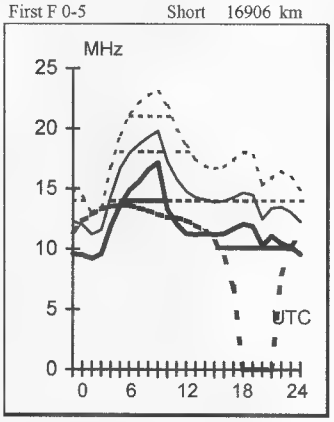
Sydney-New Delhi 302
Second 4F4-8 4E0 Short 10418 km



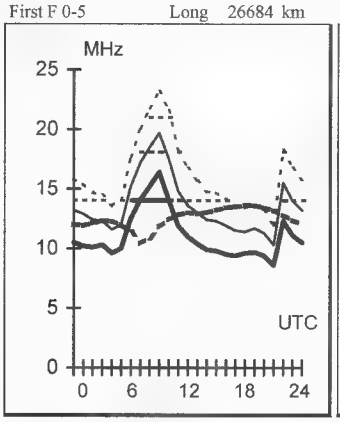
Hobart-New York 80
Short **Long** 16609 km



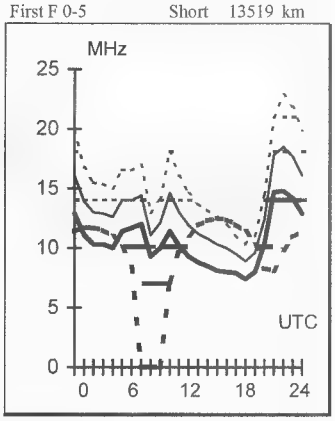
Melbourne-London 311
First F 0-5 Short 16906 km



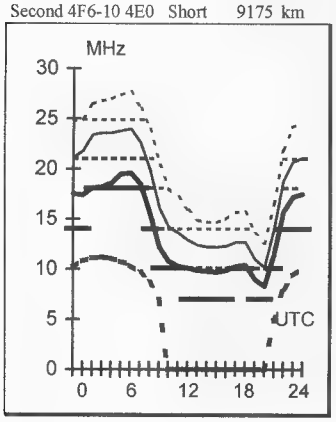
Perth-Rome 123
First F 0-5 Long 26684 km



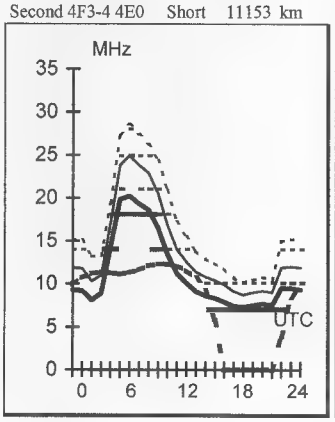
Sydney-Rio de Janeiro 164
First F 0-5 Short 13519 km



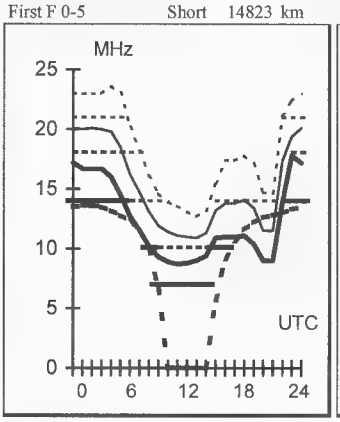
Hobart-Seoul 344
Second 4F6-10 4E0 Short 9175 km



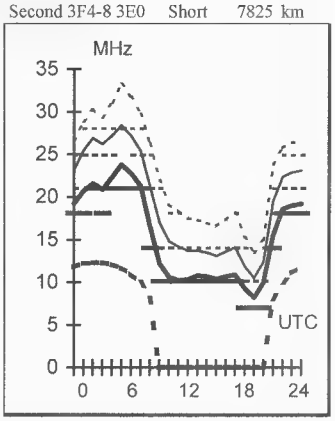
Melbourne-Lusaka 241
Second 4F3-4 4E0 Short 11153 km



Perth-Vancouver 50
First F 0-5 Short 14823 km



Sydney-Tokyo 350
Second 3F4-8 3E0 Short 7825 km



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FOR SALE QLD

• **ICOM IC-707 HF trans,** and **IC-AT500 auto tuner,** both in GC. No manuals. SK. Offers to Colin VK4ACH at 07 3356 9816, email chinxman@bigpond.net.au.

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• **Battery pack case** for ICOM IC-M7 handheld VHF marine tx, preferably BP-90 (takes six AA batteries) but BP-81, BP-82, BP-83, BP-84, BP85 or CM-89 fit.

• Also matching **chargers** and **cables** BC-72A, BC-74A, BM-76A, CP-12 or OPC-254, LC-67 waterproof bag, or any other optional extras. Don VK4AMA 07 3366 5166 email marshad@optusnet.com.au

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CONTACT WANTED SA

• Appreciate it if the former amateur who phoned me about an **AWA type TR80 transceiver** could contact me again. M Haskard VK5BA QTHR, Ph/Fax 08 8280 7192, email mhaskard@chariot.net.au

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- Hamads may be submitted by **email (preferred)** or on the **form on the reverse of your current Amateur Radio address flysheet**. Please print carefully and clearly, use upper AND lower case.
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- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from those who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
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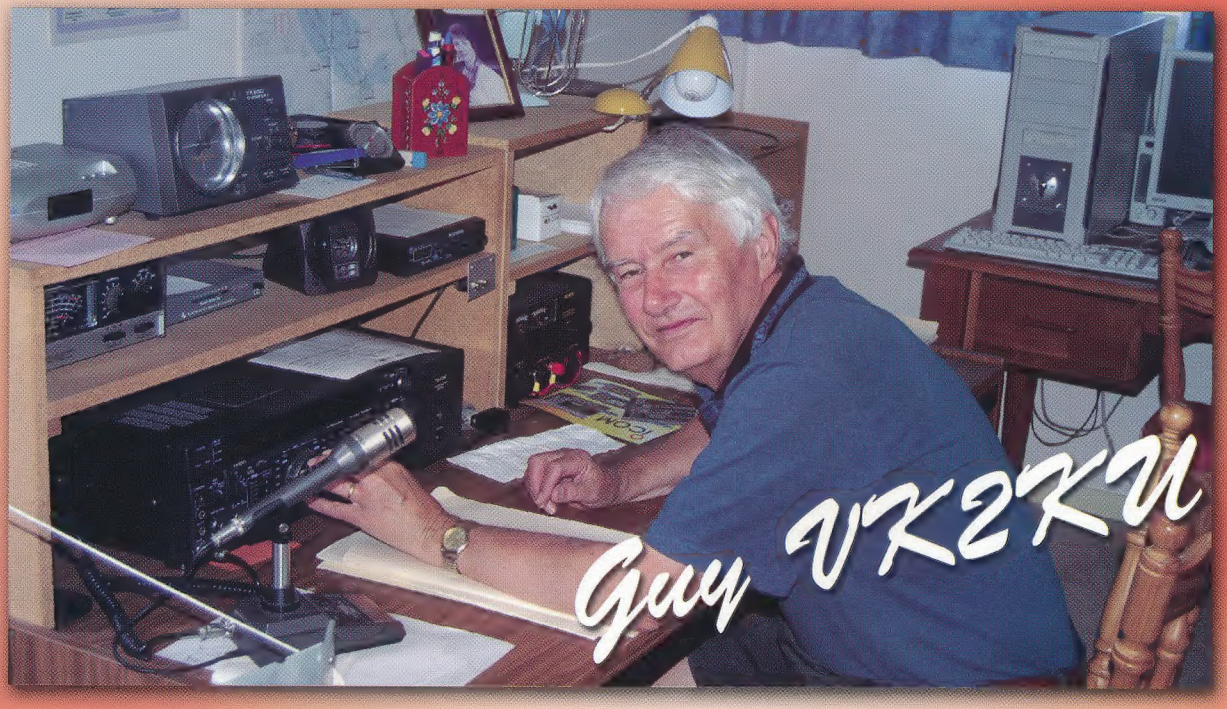
VK2 New South Wales VK2QV Chris Flak VK2XCD Chris Devery VK2BFN Adrian Clout	Phone 02 9689 2417 vk2wi@ozemail.com.au vk2advisory@wia.org.au	VK2WI - Sunday 1000 and 1930 hours local.1.845; 3.595; 7.146; 10.125; 14.170; 28.320, 52.525; 145.600; 147.000; 438.525; 1273.500 megahertz. Plus regional relays. VK1WIA news included in the morning
VK3 Victoria VK3JJB John Brown VK3PC Jim Linton VK3APO Peter Mill	Phone 03 9885 9261 arv@amateurradio.com.au	VK1WIA, Sunday 11am and 8pm, 3.615 and 7.085 (LSB), 10.130 (USB), VK3RML 146.700, VK3RMM 147.250, VK3RMU 438.075.
VK4 Queensland VK4BY Don Wilchefski VK4ZZ Gavin Reibelt VK4KF Ken Fuller	Phone 07 3221 9377 vk4advisory@wia.org.au	VK1WIA, Sunday 9.0am via HF and major VHF/UHF rptrs
VK5 South Australia and Northern Territory VK5OV David Box VK5APR Peter Reichelt VK5ATQ Trevor Quick	Phone 08 8294 2992 boxesdnm@lm.net.au peter.reichelt@bigpond.com vk5advisory@wia.org.au	VK5WI: 1843 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Mildura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 LSB, 7.065 LSB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3585kHz and 146.675 MHz FM. The broadcast is available in 'Realaudio' format from the website at www.sant.wia.org.au Broadcast Page area.
VK6 Western Australia VK6NE Neil Penfold VK6XV Roy Watkins VK6OO Bruce Hedland-Thomas	Phone 08 9351 8873 http://www.vk6.net/ vk6advisory@wia.org.au vk6ne@upnaway.com vk6xv@bigpond.net.au	VK6WIA: 146.700 FM(R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz, Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busselton, 146.900 (R) Mt William (Bunbury).147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900,147.000, 147.200, 147.250 and 147.350 MHz..Also in "Realaudio" format from the VK6 WIA website
VK7 Tasmania VK7ZAX Phil Corby VK7DG Dale Barnes VK7KK Reg Emmett	Phone 03 6234 3553 vk7advisory@wia.org.au phil.corby@tassie.net.au vk7dg@wia.org.au regemm@ozemail.com.au	VK1WIA Sunday 9am on VK7WI network: 3.570MHz LSB, 146.700 MHz FM (VK7RHT South), 53.825MHZ FM (VK7RAD South), 147.000MHz FM (VK7RAA North), 146.750 FM & 53.825MHz (VK7RNW North West), 146.625 MHz FM (VK7RMD North West), UHF CB Channel 15 (Hobart) and 27MHz CB - 27.225MHz LSB (Hobart). Followed at 9:30am with VK7 Regional News Broadcast also on 7.090MHz LSB & 14.130MHz USB

Notes

1. Only three members of the state advisory committees are listed.
2. All listings are preliminary. They will be updated each month as required.
3. Membership application forms are available from the WIA web site www.wia.org.au or the national office address above.

The man and his shack



Guy Fletcher VK2KU moved to the Southern Tablelands in April 2004, to find an RF-quiet location with no neighbours (the nearest is 1.5 km away), and no significant council problems. He chose this location with EME activities in mind and the possibility of applying for a high-power permit, and it was a reasonable site for tropospheric weak signal communications.

In early February 2005, a severe thunderstorm moved through the area. Guy suffered a near miss – a strike "landed" an estimated 150 m from the house and shack, damaging many items of electrical equipment, including gear in the shack – a "near total wipe-out" in Guy's own words.

Guy took the opportunity to rethink his approach to VHF.

Read Guy's story on page 25

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